



LACTIMED
Promoting Mediterranean Dairy Products

Developing the typical dairy products of Bizerte and Beja

Diagnosis and local strategy

November 2013



Project
funded by the
EUROPEAN UNION



**ENPI
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CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN

REFERENCES

This publication has been produced as part of the LACTIMED project with the financial assistance of the European Union under the ENPI CBC Mediterranean Sea Basin Programme. The contents of this document are the sole responsibility of Bizerte Competitiveness Pole (PCB) and the Mediterranean Agronomic Institute of Montpellier (CIHEAM-IAMM), partners of LACTIMED project, and can under no circumstances be regarded as reflecting the position of the European Union or of the Programme's management structures.

LACTIMED aims to foster the production and distribution of typical and innovative dairy products in the Mediterranean by organising local value chains, supporting producers in their development projects and creating new markets for their products. The project is implemented under the ENPI CBC MED Programme, and is financed, for an amount of EUR 4.35 million, by the European Union through the European Neighbourhood and Partnership Instrument.

The European Union is made up of 27 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.

The 2007-2013 ENPI CBC Mediterranean Sea Basin Programme is a multilateral Cross-Border Cooperation initiative funded by the European Neighbourhood and Partnership Instrument (ENPI). The Programme objective is to promote the sustainable and harmonious cooperation process at the Mediterranean Basin level by dealing with the common challenges and enhancing its endogenous potential. It finances cooperation projects as a contribution to the economic, social, environmental and cultural development of the Mediterranean region. The following 14 countries participate in the Programme: Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Malta, Palestinian Authority, Portugal, Spain, Syria, Tunisia. The Joint Managing Authority (JMA) is the Autonomous Region of Sardinia (Italy). Official Programme languages are Arabic, English and French.

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Electronic version available on: www.lactimed.eu

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CONTENTS

1. THE DAIRY INDUSTRY IN TUNISIA	6
1.1. IDENTIFYING THE INDUSTRY: STAKEHOLDERS AND ORGANISATIONS	6
1.1.1. Cattle farmers and their herds	6
1.1.2. Sheep and goat farmers and their herds	8
1.1.3. Collectors and processors	9
1.1.4. Marketing networks.....	13
1.1.5. Public institutions and professional organisations	17
1.2. INDUSTRY DYNAMICS: TRENDS AND DETERMINANTS.....	18
1.2.1. Production and collection of cow's milk	18
1.2.2. The processing industry.....	20
1.2.3. Consumption and external trade.....	23
1.3. PUBLIC POLICIES AND STAKEHOLDER STRATEGIES	26
1.3.1. Diagnosis and guidelines	26
1.3.2. Dairy industry development policies	29
1.3.3. Support programmes for research and innovation	34
2. THE DAIRY CHAIN IN BIZERTE AND BEJA	38
2.1. IDENTIFYING THE INDUSTRY	38
2.1.1. The place of agriculture and the food industry in the Governorate of Bizerte	38
2.1.2. The dairy chain in the Governorate of Bizerte	38
2.1.3. Sheep and goat farming in the Governorates of Bizerte and Beja	40
2.2. DIAGNOSIS AND PRELIMINARY GUIDELINES	41
2.2.1. Diagnosis of the cheese industry by the companies	41
2.1.3. Diagnosis of the pressed cheese niche market.....	42
2.3. RESULTS OF THE SURVEY AND ANALYSIS OF THE DAIRY CHAIN	44
2.3.1. Survey sample and methodology	44
2.3.2. Current state of the dairy chain.....	46
2.3.3 Strategic priorities to ensure development of the dairy chain.....	51

2.4. THE DAIRY CLUSTER PROJECT	54
2.4.1. Objectives and priorities	54
2.4.2. Factors of success	55
2.4.3. Potential bottlenecks.....	56
2.4.4. Governance and coordination arrangements	56
2.4.5. Potential partners.....	60
REFERENCES.....	62
APPENDIXES	64
APPENDIX 1: PUBLIC INSTITUTIONS AND PROFESSIONAL ORGANISATIONS.....	64
Public stakeholders.....	64
Support services	66
Professional organisations.....	68
APPENDIX 2: SPECIFICATIONS FOR TYPICAL DAIRY PRODUCTS OF BIZERTE AND BEJA	69
General terms and conditions	69
Typical cow's milk products of Bizerte	70
Typical sheep's milk products of Beja.....	76

1. The dairy industry in Tunisia

1.1. Identifying the industry: stakeholders and organisations

1.1.1. Cattle farmers and their herds

112,200 cattle farmers produce around 1,060 mln litres of milk from a total population of 436,000 cows, about half of which are pure breeds. The distribution of livestock farmers according to farm holding size and headcount reveals some significant disparities. Dairy cow productivity remains low compared to the potential of imported pure breeds.

SIGNIFICANT DISPARITIES IN LIVESTOCK FARMS

The distribution of livestock farmers in relation to the farm holding area indicates that more than 73% of farmers have farm holdings of less than 10 hectares and more than half of them have less than 5 hectares.

Distribution of livestock farmers according to farm holding area

≤ 5 ha	51.6%
5 à 10 ha	21.8%
10 à 50 ha	22.7%
50 à 100 ha	2.4%
≥ 100 ha	1.3%

The breakdown of cattle farmers according to the number of cows shows that:

- nearly 94% of farmers have less than 10 cows, 83% have less than 5 cows and 69% have less than 3;
- less than 200 farmers (0.17%) have more than 50 cows and about 70 (0.6%) have more than 100.

Breakdown of cattle farmers by number of cows

1 - 5	82.8%
6 - 10	10.93%
11 - 20	4.79%
21 - 50	1.31%
≥ 50	0.17%

COW BREEDS AND THEIR PRODUCTIVITY

Of the 220,000 pure breed cows present in Tunisia, 95% are Holstein-Friesians, including:

- Holstein cows imported from North America or Europe and their descendants born in Tunisia;
- Black Pied cows showing clear Holstein breed trends imported from Europe and their descendants born in Tunisia.

The second pure breed encountered in Tunisia is the Brown Swiss with a strong current trend towards the United-States Brown Swiss which represents 4% of pure breed numbers. The Tarentaise only accounts for 1% of pure breed numbers. Finally, the Red Pied (Fleckvieh, Montbeliard) has been recently introduced to Tunisia but its numbers are still very low.

The popularity among Tunisian farmers for the Holstein cow breed is due to its easy adaptation to weather conditions and its milk yields. It also adjusts to all types of diet.

In France, the Holstein cow went from an average production of around 3,000 kg per lactation in the 1950's to more than 8,500 kg per lactation in the 2000's. Production of more than 20,000 kg is not uncommon in the United-States (Tunisian dairy blog, 2007). In Tunisia, average production is in the region of 4,500 kg per lactation, but some cows exceed 11,000 kg.

The low productivity of cows relative to their potential can be explained by the quality of feed rations, which drops with the aridity in certain regions of the country. In the north, where most of the large dairy farms are

found, grass and silage are available all year round. Concentrated food supplements are entirely destined to cover the production requirements of cows. In central and southern regions of the country, intensive livestock farms predominate and concentrated feeds partly supplement basic feed rations (hay, straw, cacti, etc.) to cover cattle maintenance, growth and gestation requirements. Since 2004, the public authorities have influenced cattle imports by restricting buyers to those possessing cowsheds capable of accommodating a minimum of around 30 cows (Tunisian dairy blog, 2007).

A study conducted on “Production and Reproduction Performance of Brown Swiss and Montbeliard Cows in Sub-humid Regions of Tunisia” (Bouraoui, R., Rekik, B. & Ben Gara, A., 2009) shows a slight gain in reproduction for the Montbeliards whereas the dairy production and peaks in lactation gave the advantage to the Brown Swiss. The dairy production performance of the Brown Swiss can be explained by the rise in numbers of the latter and the decline in Montbeliard numbers in the herd under study.

In France, 3 breeds make up 93.1% of the dairy cow herd. Holstein-Friesians represent 67.3% of the headcount, followed by Montbeliard (16.6%) and Normande (9.2%). Other breeds make up only 6.9% of the total number. Next, there are crossbred cows followed by Abondance, Brown, Simmental and Lowland Red Pied breeds (Breeding Institute, 2013). The Brown Swiss has been successfully converted into a dairy breed and now ranks third in terms of average production (Breeding Institute, 2011).

Table 1: Average annual milk production by cow breed in France

Breed	Average production (Kg)	Breed	Average production (Kg)
Holstein-Friesian	10,751	Normande	7,469
Red Pied	8,718	Simmental	7,038
Brown Swiss	8,374	Abondance	6,155
Montbeliard	7,924	Tarentaise	4,919

Source: Breeding Institute, 2011

In Tunisia, average productivity per cow is estimated as follows:

- pure breed cow: 4,200 litres;
- crossbred cow: 1,100 litres;
- local cow breed: 600 litres.

PRODUCTION SYSTEMS

There are three types of dairy farming systems according to farm holding structure and the type of livestock management and diet:

▪ Traditional or extensive livestock production systems

These are widespread in the north of the country (which accounts for three-quarters of the dairy herd), but also in inland and marginal areas. They are mainly characterised by restricted rain-fed surface areas worked by a family. Herds are generally mixed, with 1-4 cows, usually of local or improved breeds.

Feed based on grazing is topped-up with fodder during difficult periods. Productivity is very limited and is usually less than 2,000 litres per cow.

“The main problem is low fertility due to poor seasonal feeding and high mortality. These problems are often linked to overstocking, and a scarcity of seasonal feed. These systems have low economic efficiency but are very well adapted to the environment and have a high ecological efficiency” (Kayouli, C., 1995).

▪ Intensive, integrated and organised livestock production systems

These concern large farm holdings in the north of the country and are widespread in the arable areas, particularly Bizerte, Mateur, Zaghouan, Fahs and Korba in the north-east (Jaouad, 2004). They account for 20% of dairy farmers.

Up to the beginning of the 1980's, the herd was made up of local breeds or crossbreeds, but it has been gradually replaced by a pure breed herd. This system is mainly geared to dairy production and characterised by a diet based on green fodder and silage with a high rate of integrated farms.

Despite local fodder production, integrated farms use large quantities of concentrates. This is partly due to the poor quality of locally produced fodder (Kayouli, C., 1995).

▪ Semi-integrated and intensive 'landless' production systems

These are mostly family dairy producers found mainly in irrigated and urban-fringe areas. The cultivated area is often limited in relation to the number of animals to around 0 - 0.3 ha/cow (Kayouli, C.). Most of the feed (fodder and concentrates) is bought-in. Family provides the labour and farmers often have an alternative source of income. Investments are reduced to a minimum with limited external funds. The number of animals varies widely but is generally 1 - 20 cows. This system has displayed dramatic growth in the Sahel (Sfax, Mahdia, Monastir, Sousse) and is commonly seen in other regions, particularly in the urban-fringe area of Tunisia and in the horticultural regions of Bizerte and Cap Bon (Kayouli, C.).

"Landless" livestock systems practiced outside agricultural areas are developing particularly in the centre of the country. They account for 22% of all livestock farms and 50% of dairy cattle farms (GIVLait).

Semi-intensive or non-integrated livestock farms in the north-west are used to fatten bull calves (GIVLait). The following table put together by Chedly Kayouli provides a good summary of the main features concerning the different dairy production systems.

Table 2: A simplified presentation of the main dairy production systems

	Extensive	Integrated	"landless"
Main location	North	North	Sahel (centre)
Fodder area	>1 ha / cow	0.25 ha – 0.75 ha / cow	0 – 0.20 ha
Cattle breed	local / cross	Holstein-Friesian	Holstein-Friesian
Herd size	1 – 20 cows	100 – 1,600 cows (companies) 1 – 40 cows (individual farmers)	1 – 20 cows
Milk yield (l/cow/yr)	<2,000	3,000 – 6,500	3,000 – 6,500
Basic feed	pasturelands	fodder/ concentrates	concentrates
Origin of fodder	grazing	farm/ market	market
Origin of straw and hay	farm	farm/ market	market
Origin of concentrates	(market)	market	market
Investment level	zero	high	limited
Origin of funds	own funds	credit	own funds
Main income	agriculture	livestock/ crops	other activities
Type of labour	family	paid	paid/ family
Mode of remuneration	family	employee	family
Trend	declining	heavy use of concentrates	organisation of the profession

Source: Kayouli, C., *Forage Resource Profile*

1.1.2. Sheep and goat farmers and their herds

Although they occupy a marginal place in the dairy industry and mainly fall into the informal sector, sheep and goat farms are nevertheless present in Tunisia and contribute to the production of artisanal products. However, data on them is scarce and difficult to verify.

SHEEP FARMING

The Sicilo-Sarda breed of sheep was introduced at the beginning of the 20th century by Sicilian farmers who settled in Tunisia and imported sheep to cater for their own fresh cheese requirements. It is currently the sole dairy sheep breed in the country. The sheep population is heterogeneous due to cross-breeding between the Sarda and Comisana breeds. Its aptitude for milking makes it the leading Tunisian dairy breed even though its production potential is relatively limited. Despite the considerable growth experienced by the livestock production sector over the last few years, dairy sheep farming has retained its traditional character with extensive livestock management methods (Jaouad et al. 2009).

Virtually all the herd (i.e. more than 99%) is located in the north of the country, particularly in the Governorates of Bizerte and Beja. All milk production is destined for processing by the Sotulaifrom company at Mateur (Governorate of Bizerte) and by artisanal cheese dairies in Beja.

Dairy sheep farming is currently experiencing renewed interest among livestock farmers as well as technical and political authorities. According to the Office of Livestock and Pasture (OEP), the herd reached its peak in the 1980's with around 200,000 dairy sheep before falling back to about 15,000 in 2009, or 10% of the 1990 numbers and 0.3% of the total sheep population. However, signs of a revival have recently appeared, including an increase in the price of milk, programmes to improve dairy sheep production potential and the organisation of producers. Furthermore, this 'small' industry is also seen as an area of experimentation for a new professional organisation of agricultural sectors and an adjustment process for public aid arising from this.

GOAT FARMING

The goat herd is very heterogeneous and mainly comprises local breeds such as different types of meat goats (Bedouin) more dairy-orientated goats (oasis-based)¹. Performance assessments have shown that local goat breed productivity is low. This is down to a lack of natural resources, structures, traditional livestock management methods and above all, the genetic potential of the indigenous livestock herd (Gaddour & Najari, 2009).

Aside from local breeds, the following breeds are also present in Tunisia²:

- Maltese, found throughout Tunisia, especially along the coasts (Bizerte, Nabeul);
- Damascus, specialised in meat production;
- Murcianna Grenadina, a mixed-breed goat;
- Alpine, big milk yields, average size.

The table below indicates the change in goat numbers between 2004 and 2010.

Table 3: Change in goat numbers (*thousand females*)

Year	2004	2005	2006	2007	2009	2010
Headcount	809	809	820	856	811	708

Source: National Institute of Statistics (INS)

Goat farming is concentrated in the south of the country. There is a large herd being raised in oases for milk production alongside traditional goat farming for indigenous meat production (Gaddour & Najari, 2012).

1.1.3. Collectors and processors

COW'S MILK COLLECTION

The network of cow's milk collection centres has experienced significant growth since the start of the 1980's. Currently, more than 230 collection centres, with a total capacity exceeding 2.5 mln litres, collect around 640 mln litres, or more than 60% of the national raw milk production.

The collection centres supply up to 85% of fresh milk to the central dairies with the rest coming directly from large livestock farms.

Given their key position between the livestock farmers and the processors, collection centres play a very important role in the dairy industry. They make it possible to enhance dairy production by ensuring producers can constantly sell their produce while guaranteeing regular supplies to the central dairies.

In addition, the quality of milk received by the central dairies is also conditioned in large part by the controls and expertise of staff at the collection centres.

The collection centres are managed by several types of organisations. These include the Office of Livestock and Pasture (OEP), agricultural service cooperatives (CAS), private and industrial operators (central dairies, cheese dairies, etc.).

¹ FAO, The Tunisian experience in the goat's milk sector: the plan to intensify dairy goat farming in Tunisian oases (Franco-Tunisian cooperation: OEP - UCARDEC): http://www.fao.org/docrep/w3586f/w3586f05.htm#!l'expérience_tunisienne_en_matière_de_filière_lait_caprine: (Document in French)

² Ben Ammar M., Mechrgui S. and Bouhbil M. (2013), Study of the dairy goat farming system in the region of Sejnene-Ghézala and the aptitude of goat's milk for processing. Final year study project, Mateur School of Higher Education in Agriculture. (Document in French)

The milk is transported to the collection centres by 3 main channels:

- farmers deliver their produce once or twice a day to the collection centre and sometimes directly to the central dairy;
- the collection centre collects the milk from the farm;
- hawkers collect the milk and deliver it to collection centres, factories, or directly to users (dairymen, cafe owners, consumers).

Milk collection intended for direct sale is undertaken primarily by hawkers who collect the milk from the farmers. No checks are made on this milk which is sold to retailers and users. The peddling of raw milk and its direct sale therefore represents a potential danger to consumer health due to the possible presence of pathogens that could generate certain diseases such as brucellosis, tuberculosis and salmonella, etc.

By contrast, the collection centres have been subject to a health certification process since December 2008. This forces them to comply with hygiene and quality standards in terms of facilities and production techniques.

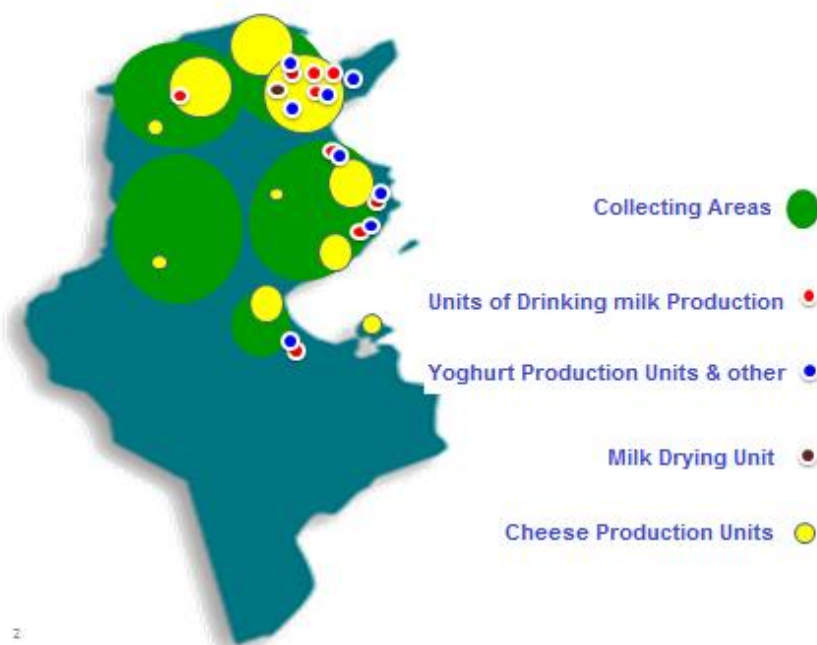
“The introduction of a health certification process for collection centres and dairy processing units is a major step forward for the Tunisian milk sector and for protecting consumer health. Compliance with progress, separating flows, systematic cleaning of milk containers (drums, tanker trucks, chilling and storage tanks) have helped make significant changes to the ‘appearance’ of collection centres and milk processing units” (Tunisian dairy blog, 25 March 2010).

THE INDUSTRIAL FABRIC

Processing capacities

The milk processing sector consists of:

- 9 central dairies producing drinking milk and fresh milk products. 4 of them have 90% of the drinking milk market including the leader which has around 60% of the market on its own. These central dairies have a daily fresh milk and milk product processing capacity of 2.5 mln litres;
- 1 central dairy producing dairy products only has 65% of the yoghurt market (the first 4 central dairies have 91% of this market) with a capacity of 450,000 litres/day;
- 1 milk drying unit with a capacity of 150,000 litres/day;
- 50 cheese production units using fresh milk (industrial and artisanal facilities) with a processing capacity of around 500,000 litres/day;
- 5 processed cheese production units;
- 3 ice cream production units.

Map 1: Geographical distribution of industrial fabric


Source: Louhichi, R. (2013)

The dairy industry in figures

Quantities of milk collected daily were estimated at 1.7 mln litres for the month of January 2013, compared to forecasts of 2 mln litres during the peak production period (March, April and May 2013).

Average daily collection during the low production period (October, November and December) ranges from 1.4 mln to 1.5 mln litres.

Milk collection operations are broken down nationally into 5 collection areas. The north-west zone (Governorates of Beja and Jendouba) accounts for 20% of the total quantity of milk collected.

The milk collection in the north-east area (Bizerte, Ariana and La Manouba) represents 25% of total quantities collected. The contribution of the centre-west area (Governorates of Sidi Bouzid, Gafsa and Kasserine) is around 20%.

The centre-east (Mahdia, Sfax and Monastir) accounts for 32% of total collected quantities while the Gabes area collects 3%. According to figures from GIVLait, milk production reached 509 mln litres in 2012, 14% higher compared to 2011 (447 mln litres).

The same source indicates that national milk production varied between 1 and 1.13 bln litres in 2012 compared to 1.88 bln in 2011.

It is worth remembering that the production estimate commission which is an arm of the Directorate General for Agricultural Production at the Ministry of Agriculture is responsible for setting annual milk production quantities.

The quantities of milk received by the 9 factories approached 619 mln litres in 2012 compared to 536 mln litres in 2011, i.e. a rise of 15%.

The daily processing capacity of these factories is about 2.5 mln litres whereas the production capacity of the freeze-drying unit (powdered milk), situated in the region of Mornaguia (Governorate of La Manouba), reaches about 150,000 litres a day.

As concerns the daily milk requirements of yoghurt production plants (7 factories), this is around 500,000 litres whereas the production capacity of cheese production plants (24 factories) is estimated at 500,000 litres of milk daily.

The production capacity of milk and dairy product factories is therefore estimated to be 3.65 mln litres per day.

Source: The press, 28 February 2013

PRODUCT RANGE

The dairy industry encompasses the following activities in order of importance (APII, 2010):

- pasteurised, sterilised or UHT drinking milk with 3 grades of cream (skimmed, semi-skimmed and whole fat);
- yoghurt and fresh products such as fermented milks (Raieb, Leben), milk-based desserts, etc.;
- butter, produced from the cream of fresh milk or from the fat content of imported anhydrous milk fat (MGLA);
- cheese: fresh, pressed, processed;
- powder and other milk concentrates;
- ice cream.

The table below shows the share in volumes produced (equiv. litres of milk) of each of these product families.

Table 4: Breakdown of the different product families (2009-2011 averages)

	Production <i>(millions of litres in milk equivalent)</i>	%
UHT milk	434.3	57.1
Yoghurts	146.7	19.3
Cheese	126.7	16.7
Others	52.3	6.9
Total	760	100

The development of partnership strategies by leading companies in the sector has helped introduce top international brands and delivered a clear improvement to expanding the product range and to the marketing management system associated with the partner's reputation.

▪ Drinking milk

This product family represents more than 57% of the country's dairy industry capacity.

Drinking milk is packaged in plastic bottles and packs making up a very wide range: whole, semi-skimmed and skimmed milk, flavoured milk, vitamin-enriched milk, reduced-fat milk, etc. To this industrial range can be added, fresh non-industrially produced milk, distributed in bulk which goes through hawkers and is sold locally. Sterilised milk production is done entirely using local fresh milk, following a gradual reduction and subsequent total disappearance in the use of powdered milk in 1998.

Drinking milk production caters for the country's entire domestic needs and even allows for a surplus absorbed by emergency stocks, exports to neighbouring countries and the freeze-drying unit.

▪ Yoghurts and fermented milks

Yoghurt production has experienced significant growth over the last three decades following heavy investment by private investors and the rapid growth in national consumption. Yoghurt is made exclusively from fresh milk. For technical reasons (to increase the dry extract), imported milk powder is added to yoghurt, though in doses not exceeding 5%.

Currently, the yoghurt industry features relatively recent facilities, good use of technology, acceptable quality products, fair competition and a fast-expanding local market (APII, 2010). The installed capacity to manufacture yoghurt is about 700,000 litres³ per day, split between the 9 central dairies and 1 specialised yoghurt production unit.

The product range on offer is quite wide and includes natural, sugared and flavoured yoghurts, drinking yoghurts, fruit-pulp yoghurts, enriched and light yoghurts, etc. Other fermented dairy products are also produced but in much smaller quantities such Raieb and Leben; products which were once only made artisanally.

Set prices and subsidies do not apply to yoghurt and fresh products which are subject to 18% VAT.

³ One litre of milk produces 8 pots of yoghurt

▪ Cheese

The cheese industry started in Tunisia with a few artisanal workshops producing cheese from cow's milk and sheep's milk. It was after the 1980's, and following restrictions on cheese imports, that several industrial cheese dairies developed in the country.

Currently, the installed capacity for cheese production is 500,000 litres of milk per day, or 150 mln litres per year, split between about fifty cheese dairies. These units produce fresh, pressed, soft and processed cheeses. 5 units produce processed cheese from imported cheese off-cuts with a total capacity of 8,000 tons per year. In addition to these units, several artisanal cheese dairies produce mostly fresh cheeses.

▪ Milk powder

Drying milk is one of the ways professionals in the sector have of dealing with milk surpluses. A privately-owned milk desiccation (drying) plant with a capacity of 150,000 litres per day has been set up in the region of El Mornaguia.

This unit began working in late 2000 and stopped in 2008 due to a lack of available milk following poor weather which affected milk production. The drying unit started up again in 2011 to help absorb surplus milk production. Indeed, over this last year, farmers have complained about the milk surplus and congestion when their products are delivered to the collection centres and processing units.

1.1.4. Marketing networks

Thanks to the remarkable growth of the collection network, the share held by the informal circuit as an outlet for milk production in Tunisia has substantially decreased. This share, which was more than 57% in 1992-1994, is now around 28%. That said, the organised collection circuit still cannot cater for production as a whole, especially in peak production periods. About 300 mln litres are sold annually by the informal circuit, including sales of fresh milk direct to the consumer and sales to artisanal creameries.

THE SECTOR DIAGRAM: THE MAIN CIRCUITS

▪ The informal circuit

The informal circuit mainly includes local sales of raw milk and hawking.

Local sales of raw milk concern small livestock farmers who opt to sell their milk (or part of it) directly to consumers for various reasons:

- difficult access to collection centres;
- partial removal of intermediary margins and increased income from milk sales;
- guarantee of selling production on a daily basis.

The farmer's home constitutes the point of sale and his family members (wife and children) play the role of sellers. However, this type of selling is declining, particularly with the growth of collection centres. Hawkers obtain supplies directly from farmers and deliver to customers. This type of selling suits producers and processors as well as the consumer.

Indeed, producers and hawkers (CNEA, 2006):

- often offer cheaper production prices than collection centres;
- cater for small and medium-sized producers who cannot deliver to collection centres due to a lack of transport;
- pay weekly while collection centres generally pay on a monthly-basis;
- provide some services to small producers and sometimes advance money to them.

Factories view the hawker as a main player in mobile collection and do not hesitate to accept his unsold milk at the end of the day.

As for consumers, they choose hawkers for different reasons:

- they offer milk at a cheaper price than sterilised milk;
- they deliver milk to homes on a daily-basis;

- they guarantee 'natural' milk that has not undergone any chemical treatment and therefore retains all the natural elements beneficial for the body.

Broadly speaking, the prices practiced in informal marketing channels remain largely below the price per litre of packaged milk. According to Tunisian Ministry of Commerce certification in 2012, the average price per litre of milk (semi-skimmed) was between 1,010 and 1,060 millimes, according to the type of packaging⁴. By contrast, the average price practiced by livestock farmers (for direct sales) is 750 millimes and that set by hawkers is 800 millimes.

"The hawker therefore benefits from the lack of organisation among the producers, the opportunism of factories and the tolerance from public authorities. However, the disadvantages of hawking are many. Hawkers avoid taxation and quality control, they sell milk of highly doubtful quality, seriously impede the development of organised and controlled collection and pose a serious threat to consumer health" (CNEA, 2006).

In Tunisia, the Law 64-49 of 24 December 1964 on production control, already prohibited the selling of raw milk to reduce hawking. Some forty years later, the Law N° 2005-95 of 18 October 2005 on livestock farming and animal products, set health and technical conditions to be respected when transporting raw milk. These rules have not been applied, most probably because hawking employs a large number of people and because the authorities do not always apply the law for socio-economic reasons.

▪ **The organised circuit**

The organised circuit consists of collection centres, industrial production companies and distribution channels that convey milk and dairy products to points of sale for consumers.

In general, the large producers are tied into contracts with factories which collect the milk from the farm, or receive it at the factory if producers have refrigerated means of transport. Small and medium-sized producers either deliver to the collection centres or to hawkers.

▪ **The sector diagram**

The way the sector is structured can be represented by:

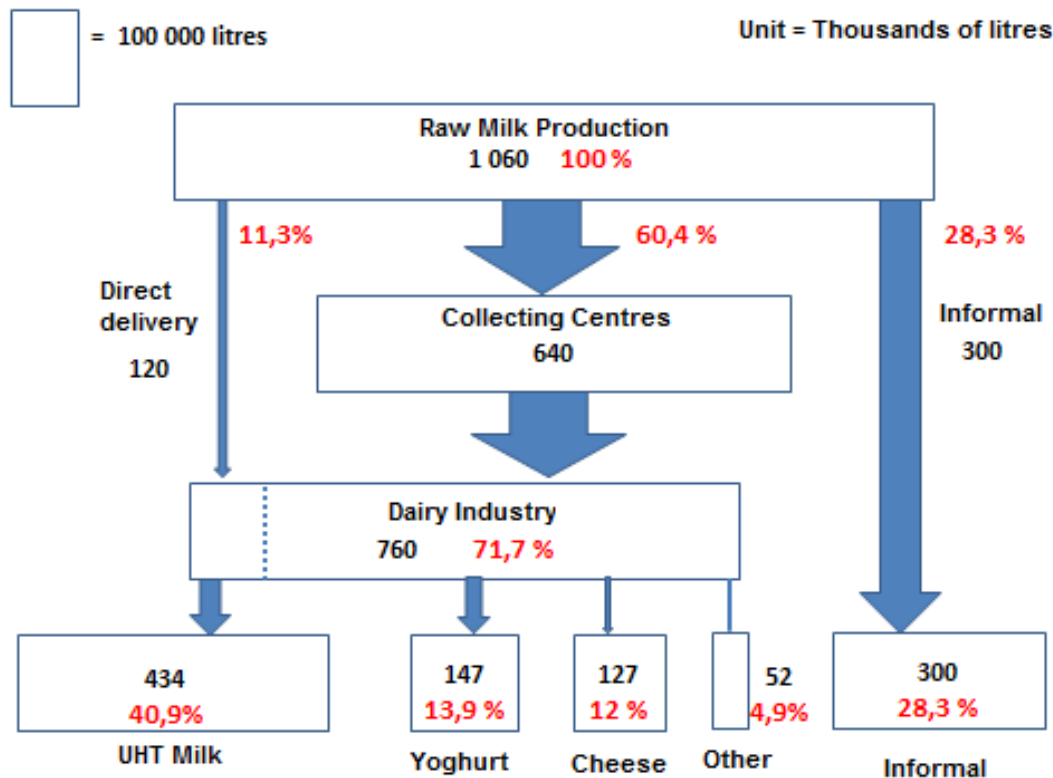
- a simplified diagram representing the flows of the two main circuits (diagram 1);
- a diagram indicating the main distribution channels of the organised circuit (diagram 2).

Diagram 1 does not cover all the sector's complexity which, in reality, includes a large number of more or less cross-cutting circuits. It identifies the two main subsystems:

- the organised subsystem, featuring factories that receive national milk production either directly or via collection centres;
- the informal subsystem covering self-supply, local sales of raw milk and hawking.

These two subsystems maintain cross-overs at several levels within the sector, which are not indicated in the simplified diagram.

⁴ Price of semi-skimmed milk: 1litre triple-layer bottle with cap = 1,020 ml / 1litre bottle =1,010 ml / Tetra Pack 1L = 1,060 ml

Diagram 1: Simplified diagram of the milk sector in Tunisia (Average 2009-2011)


Source: prepared by the author

This mapping shows the overall structure of the sector by presenting the different components and their relations. It makes it possible to:

- visualise the relative significance of each of the components in relation to the others and to their interdependencies;
- distinguish the different types of circuits and identify primary vs secondary ones;
- distinguish the different stages of transactions corresponding to the different types of markets;
- assess resource-employment relationships at different levels and verify the consistency of the statistical data.

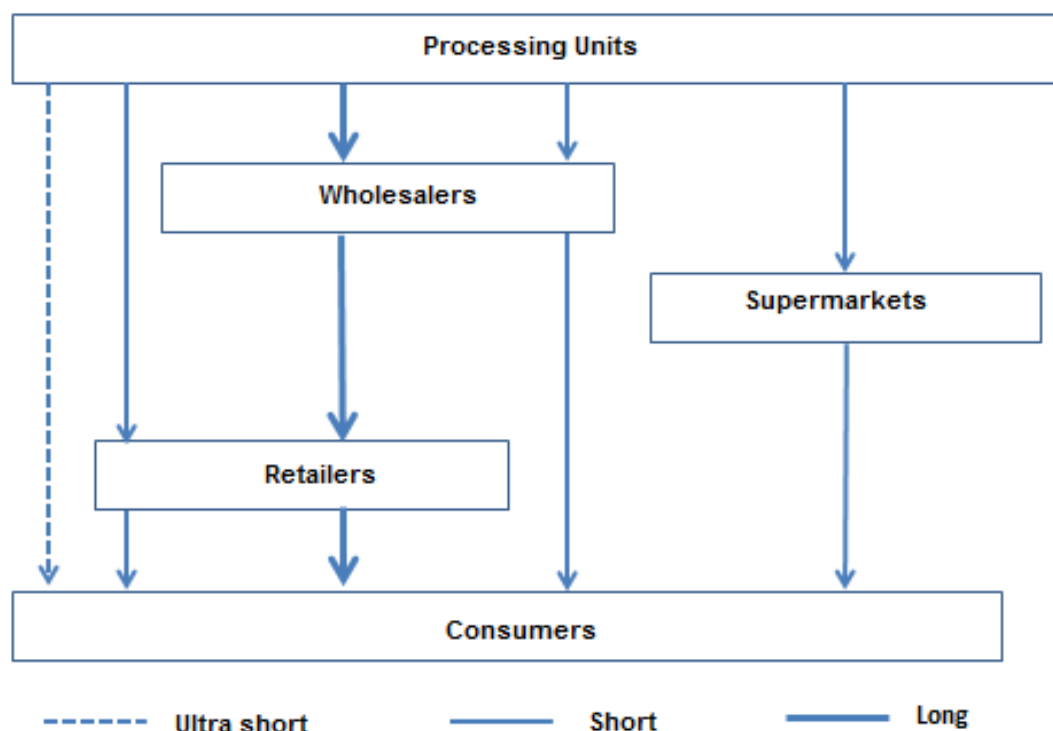
DISTRIBUTION CHANNELS

The distribution of milk and dairy products to consumers is done through very varied marketing channels. According to the number of intermediaries between producers and the final consumer, 3 types of distribution channels can be identified:

- ultra-short channels for direct sales from producer to consumer;
- short channels that include a single intermediary between producer and consumer;
- long channels featuring a number of intermediaries equal or superior to 2.

This marketing chain involves several types of stakeholders:

- wholesale agents spread throughout the country and sometimes linked to contracts with the large central dairies who play a very important role in supplying small neighbourhood grocery stores on a daily basis;
- retailers supplied by wholesalers or directly by the central dairies who resell to consumers;
- supermarkets which incorporate the job of wholesaler and retailer;
- public authorities, mostly supplied directly.

Diagram 2: Distribution channels of industrial dairy products


Source: prepared by the author

The Tunisian network of supermarkets and hypermarkets comprises:

- 2 hypermarkets located in Greater Tunis: Carrefour and Géant;
- more than 140 supermarkets across the country⁵.

The hypermarket and supermarket dairy product offer is quite varied. It includes milk, fermented milk, yoghurt, cheese, butter, crème fraîche, milk-based desserts, etc. It generally consists of industrial and artisanal products supplied by small processors. Hypermarkets and supermarkets usually have a shelf space for dairy products and especially a cheese counter.

Neighbourhood grocery stores⁶ represent a place for local purchases on a daily basis. The range of dairy products they offer is much smaller than that of the hypermarkets and supermarkets. In addition to industrial products, neighbourhood grocery stores can offer artisanal products which are generally supplied by small processors in the local area. Deliveries are on a daily basis and in small quantities.

Neighbourhood grocery stores take a significant share of food sales, especially in rural areas. This share is estimated at 80% (MAC SA, 2010) and can be explained by several factors, the most important being the many services and advantages offered by this type of retail (proximity, ad-hoc purchases and payment facilities, etc.).

Creameries are mostly part of the informal circuit inasmuch as they are not supplied by the industrial circuit but rather by small local processors. In addition to fresh milk in bulk, they display fresh artisanal products such as traditional Sicilian-type cheeses in all its shapes and forms (salted, semi-salted, unsalted, etc.), Lben, Raieb, butter, Smen, etc. Some small processors have their own creameries, which represent a sales outlet for their products.

⁵ Number of points of sale per retail chain: 52 Monoprix, 42 Carrefour Markets, 46 Magasin Général, 6 Promogros

⁶ More than 55,000 throughout Tunisia

1.1.5. Public institutions and professional organisations

The dairy sector is controlled and coordinated by a large number of institutions that can be grouped together into 3 main categories (see Appendix 1 for more details):

▪ **Public stakeholders**

The Ministry of Agriculture and Hydraulic Resources at a national level and the Regional Offices of Agricultural Development (CRDA) at regional level control the sanitary quality of all links in the chain, from production to distribution, including checks on veterinary products. The State Lands Office (OTD) is responsible for managing 153,000 ha of State-owned land, diversifying agricultural production and introducing new farming techniques. It also includes a livestock department, with around 12,000 heads of cattle, 58,000 sheep and 2 cheese dairies. The Office of Livestock and Pasture (OEP) deals specifically with the dairy sector and focuses its activities on developing fodder and pasture resources, promoting livestock-rearing techniques, monitoring the sector and taking on other specific tasks to develop it. The Agriculture Investment Promotion Agency (APIA) provides a range of services to encourage, promote and support agriculture, fisheries and first-level processing investment ventures. Finally, the Agricultural Extension and Training Agency (AVFA) is responsible for monitoring training programmes and agricultural extension. The CRDAs and the Regional Extension Units (CTV) implement these programmes on the ground.

▪ **Support services**

Some support services specialise in livestock farming. The National Centre for Animal Health Surveillance (CNVZ), the Tunisian Veterinary Research Institute (IRVT) and the National Gene Bank (BNG) are scientific and technical bodies which provide support to authorities and operators in the sector by disseminating information and research work as well as by popularising technical, technological and organisational innovations. The IRVT's regional laboratories are used to provide logistical and scientific support for epidemiology surveillance networks while the BNG undertakes work to collect, repatriate and conserve sheep and cattle genetic resources. Other support services cater more widely for the agri-food sector. For instance, the National Centre of Agricultural Studies (CNEA), the Agri-Food Technical Centre (CTAA) and the Bizerte Competitiveness Pole (PCB) provide their support to develop and promote the Tunisian agricultural and food sectors by offering studies, assistance and training services to businesses and project developers. Finally, the National Agricultural Bank (BNA) is a key player in financing the farming and agri-food sector.

▪ **Professional organisations**

Four professional organisations comprising the Interprofessional Group of Red Meat and Milk (GIVLait), the Tunisian Union of Agriculture and Fisheries (UTAP), the Tunisian Farmers Syndicate (Synagri) and the Tunisian Union of Industry, Commerce and Crafts (UTICA) work as coordinating bodies for stakeholders in the dairy sector. GIVLait is a technical body created by the State in 1984. It is managed by professionals and works more precisely on organising the red meat and milk sectors, developing relations between professions, promoting quality and regulating the market.

1.2. Industry dynamics: trends and determinants

1.2.1. Production and collection of cow's milk

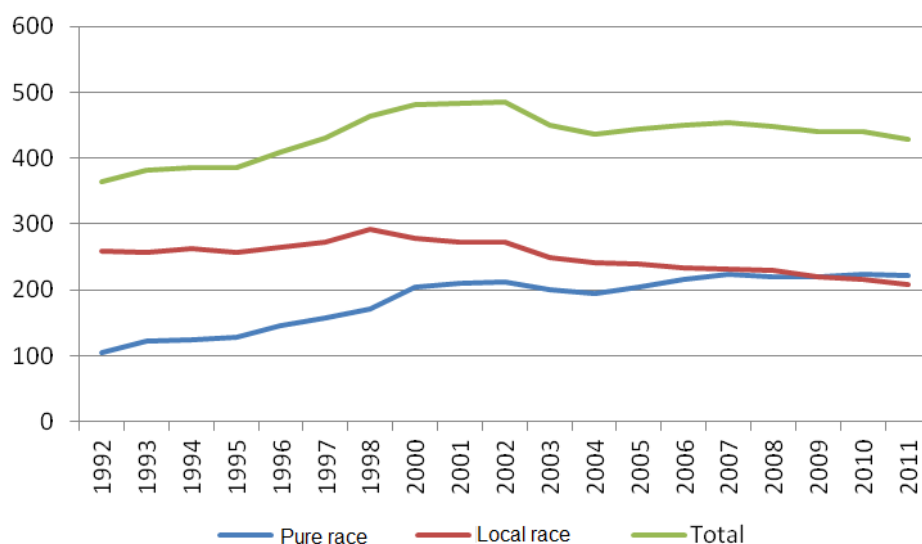
The import of heifers coupled with the introduction of artificial insemination and the setting-up of milk collection centres has contributed greatly to developing national milk production and reaching self-sufficiency despite short-term imports. Tunisia also continues to import heifers despite the significant proportion of pure-breed cattle capable of addressing the need to grow the dairy herd.

In spite of a fodder shortage made worse by successive droughts, milk production continues to grow. Quantities of milk collected in the organised circuit have grown more quickly than production. Collection rates of less than 30% in the 1980's exceeded 50% in 2000 and 60% as of 2011.

CHANGES IN CATTLE NUMBERS AND HERD COMPOSITION

The dairy cow herd experienced regular growth up to 1999 before settling out at around 480,000 dairy cows for the period 1999-2002. Next, it recorded a steady reduction until 2011 when cattle numbers fell below 430,000 heads.

Graph 1: Change in cattle numbers and genetic structure of the herd (1992-2011)



The drought recorded in 2003-2004 and 2007-2008 is the main cause advanced to explain such a fall, but other factors also contributed to it:

- Reproduction rates tumbled leading to the early culling and slaughter of imported females with high genetic potential;
- Numerous livestock farmers got rid of their calves and replacement heifers due to high feed costs (nearly 15% of calves and breeding heifers in 2003);
- Some central dairies had difficulties in paying collection centres and, consequently, the producers at a time when the latter needed liquidity the most to purchase increasingly expensive feeds. In 2004, the sums owed to producers reached 9 mln Dinars. To overcome this problem, producers had to sell part of their herd (5% of cows in production), undertake early culling and sell their milk to hawkers who paid cash.

The genetic structure of the herd also changed considerably. The proportion of pure breeds which was barely 6% in 1975 exceeded 29% in 1992, 42% in 2000 and reached over 50% as of 2009.

Table 5: Changes in cattle numbers and genetic structure of the herd 2000-2011

Units: Thousand females		Source: GIVLAIT											
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Pure breed	204	211	212	201	195	205	216	223	220	220	223	221	
Local cross-breed	278	273	273	249	241	239	234	231	229	220	217	208	
Total	482	484	485	450	436	444	450	454	449	440	440	429	

The headcount of local and cross-breed cattle has dropped since 2000 at an average annual rate of 6,300 heads. During the period 1992-2000, 33,000 pure or mixed-breed dairy heifers were imported, or 3,600 per year on average.

To improve the performance of the Tunisian local cattle herd, the Tunisian State introduced a selection programme in the 1970's using artificial insemination and natural mating. Bulls from the 3 main breeds (Tarentaise, Brown Swiss and Black Pied) were used (Abdelguerfi A., Laouar M., 2000).

After having experienced some growth between 1970 and 1975 (95% of total cattle numbers), the local and crossbred cattle population has been falling back constantly, by nearly 37% between 1975 and 1990 (Kayouli, C., 1995). This decrease mainly benefited the introduction of pure breeds, principally represented by 3 breeds (Black Pied, Brown Swiss and Tarentaise).

During the last two decades, there has been a domination of Holstein and/or Holstein-crossed Black Pied imports. The latter currently make up more than 95% of the total pure breed headcount.

CHANGE IN MILK PRODUCTION

Milk production has made remarkable headway during the years following the introduction of a dairy strategy in 1994, which had the aim of achieving self-sufficiency by 2000. Between 1994 and 2000, it rose by 70% and helped achieve this goal.

Since then, growth has slackened. Over the period 2000-2011, production only grew by 21%. The increase was nevertheless maintained despite the drop in dairy cow numbers due to imports of pure-bred heifers and an improved cow productivity.

In 2002, a surplus of 46 mln litres was reached. 6 mln litres were exported and 40 mln litres were processed into milk powder. Milk production then experienced a fall in 2003 and especially 2004 which was reflected in the resumption of imports. Production started to rise again over the period 2004-2011 at an average annual growth rate of nearly 3.2%.

Table 6: Changes in milk production

Units: Millions of litres

Source: GIVLAIT

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Milk production	887	934	940	891	864	920	971	1,006	1,014	1,030	1,050	1,076

CHANGES IN MILK COLLECTION

The quantity collected experienced a more rapid increase than that of production thanks to the reorganisation of the sector and particularly to the introduction of a primary milk collection network and the setting-up of central dairies.

The rapid growth in the collection and processing of fresh milk is also due to taxation on imported milk powder and subsidies for processing locally produced fresh milk.

The quantity collected went from 160 mln litres in 1994 to 444 mln in 2000, i.e. a rise of 177%. It increased by 50% over the following 11 years to reach 664 mln litres in 2011.

Table 7: Changes in quantities collected

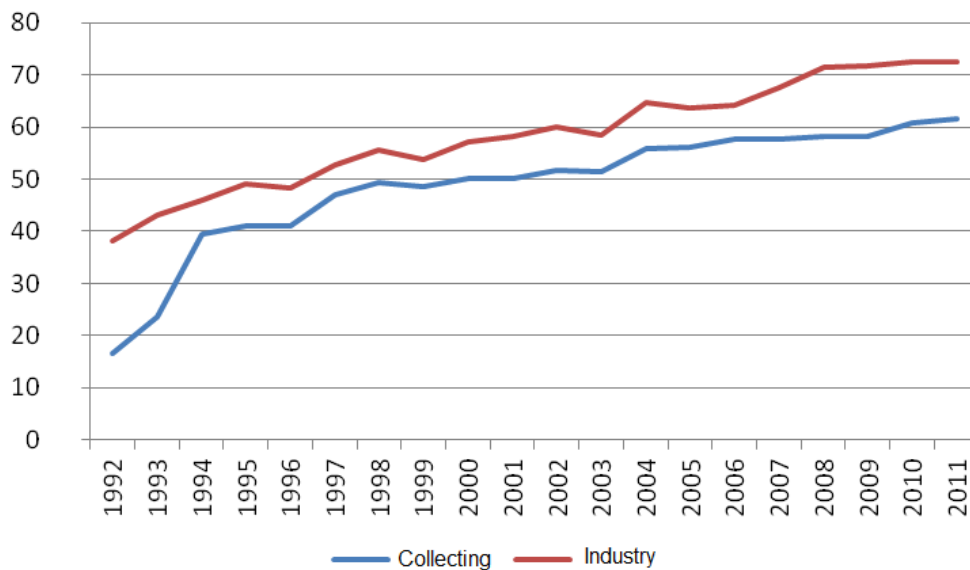
Units: Millions of litres

Source: GIVLAIT

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Quantity collected	444	469	485	458	483	517	560	579	589	599	639	664

The increase in milk collection during the 1990's has been extraordinary, boosted by the new dairy policy introduced in 1994: the quantities collected were multiplied by 13, rising from an average of 29,000 litres over the period 1987-1989 to 466,000 litres in 2000-2002. They then exceeded 630,000 litres in 2009-2011.

Collection rates, which were less than 30% in the 1980's, rose to over 50% in 2000, then 60% from 2011. Taking into account the quantities of milk delivered directly to production units, the share of production of raw milk destined for industrial processing exceeded 70% in 2008.

Graph 2: Proportion of collection and industrial supply in milk production (%)


1.2.2. The processing industry

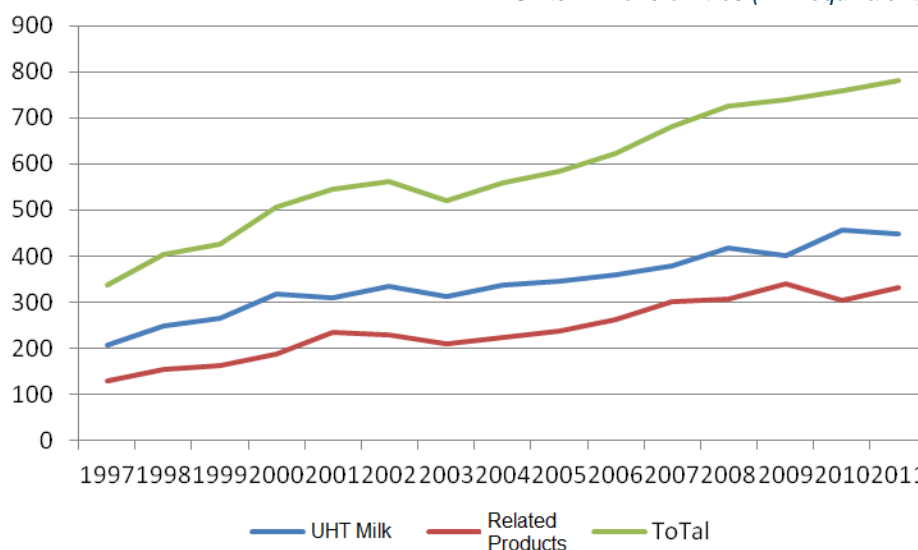
CHANGES IN UHT MILK PRODUCTION AND DAIRY PRODUCTS

Up until 1992, the drinking milk industry was largely based (more than 80%) on the reconstitution of imported milk powder. Since then, processing locally produced fresh milk into drinking milk has grown rapidly thanks to a dairy policy that introduced several measures such as taxes on imported milk powder, subsidies for processing fresh milk and incentives to develop the fresh milk collection network. These measures encouraged livestock farmers to increase their production and sell it on the market (APII, 2010).

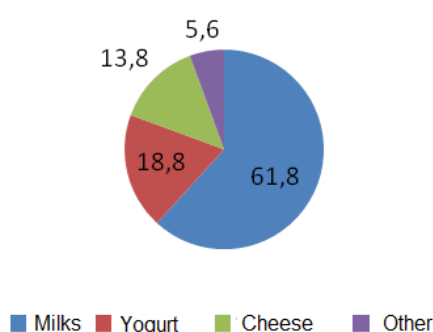
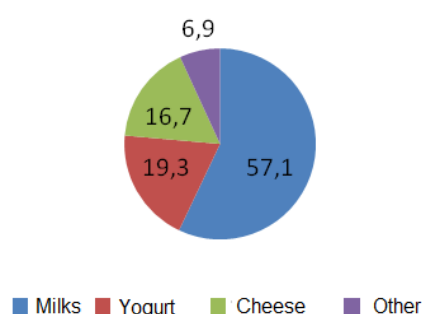
The dairy industry therefore experienced remarkable growth between 1997 and 2011. During this period, industrial production (expressed in milk equivalent) rose by a factor of 2.3, increasing from 337 to 780 mln litres.

Table 8: Processed dairy products 2000-2011
Units: Millions of litres (Milk equivalent)
Source: GIVLAIT

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
UHT milk	319	310	334	312	336	347	360	378	419	400	456	447
Yoghurt	85	90	104	95	100	112	125	140	144	155	140	145
Cheese	73	75	81	80	83	85	95	110	116	130	120	130
Other by-products	28	30	27	28	28	35	35	40	46	55	44	48
Milk powder	2	39	17	6	2	6	7	12	-	-	-	10
Industry total	507	544	563	521	559	585	622	680	725	740	760	780

Graph 3: Changes in UHT milk production and dairy products 1997-2001
Units: Millions of litres (Milk equivalent)


The production of dairy products rose more quickly than that of drinking milk whose share in total production dropped from 62% to 57% between 1997-1999 and 2009-2011 as the changes in breakdown of product families below shows.

Graph 4: Breakdown of the different product families
Average 1997- 1999

Average 2009- 2011


Yoghurt production, expressed in milk equivalent, has doubled in 12 years to reach an average of 146.7 mln litres in 2009-2011 compared to 73.3 mln litres in 1997-1999.

Table 9: Changes in yoghurt production

Year	2004	2005	2006	2007	2008
Production (<i>millions of pots</i>)	830	884	944	1,190	1,020

This performance is due to two main factors (APII, 2010):

- the expansion of the capacity of several integrated central dairies equipped with advanced technology;
- partnerships with foreign companies enabling the introduction of new products (creamy desserts, drinking yoghurts, etc.) to the market as well as effective marketing methods.

Cheese production has grown by 52% in 4 years, from 14,800 tonnes in 2004 to 31,300 tonnes in 2008, as shown in the following table (APII, 2010).

Table 10: Changes in cheese production

Year	2004	2005	2006	2007	2008
Production (<i>tonnes</i>)	14,800	17,000	20,000	24,100	31,300

Despite these advances, cheese production remains short of its potential and consumption is still limited. This business suffers from several handicaps, the most important of which are (APII, 2010):

- a consumer price that remains high in comparison to average consumer purchasing power (distributors take a fairly significant margin);
- poor bacteriological quality of fresh milk;
- difficulties in the supply of milk, in quantity and quality;
- poorly-mastered technology and a lack of specialised technicians.

CHANGES IN PRODUCTION CAPACITIES

Until the beginning of the 1990's, more than 80% of supplies to the Tunisian dairy industry came from imported milk powder which was regenerated locally.

The Tunisian Dairy Products Company (STIL), created in 1961, together with Tunisie Lait, Tunisia's second leading public sector company, established in 1978, both benefited from a dominant position on the milk and dairy products market, leading to a situation of cartel. Operating as public service providers, these companies "had to adhere to directives from political authorities on production and supplies of drinking milk and play the role of regulator without consideration for profit outlooks or management constraints. The privilege of exclusivity extended to other specific activities such as importing and marketing certain dairy products and other high value-added food varieties (butter, cheeses, fruits, alcoholic drinks, etc.)." (Tustex, 2005)

These two companies gradually lost their monopoly with the introduction of a structural adjustment programme (from 1986), the 1994 dairy strategy and the creation of several central dairies as presented in the table below.

Table 11: The central dairies in Tunisia and their main features

	Date established	Capacity (litres/day)	Location
Délice-Danone Group			
CLC	1978 and 1998	600,000	Slimane
STIAL	2011	450,000	Slimane
LAINO (CLN)	1990	450,000	Boussalem
Poulina Group			
Agromed	1996	250,000	Sfax
GIPA	1999	100,000	Nabeul
Tunisie Lait	1978	400,000	Sidi Bouali
Vitalait (CLM)	1998	400,000	Mahdia
TLD	2000	150,000	Mornaguia
SLD (SBFT Group)	1963	150,000	Oued Ellil
Soril	1981	150,000	Ben Arous & Koutine (Mednine)
Total		3,100,000	

NB: 2 central dairies are currently under construction:

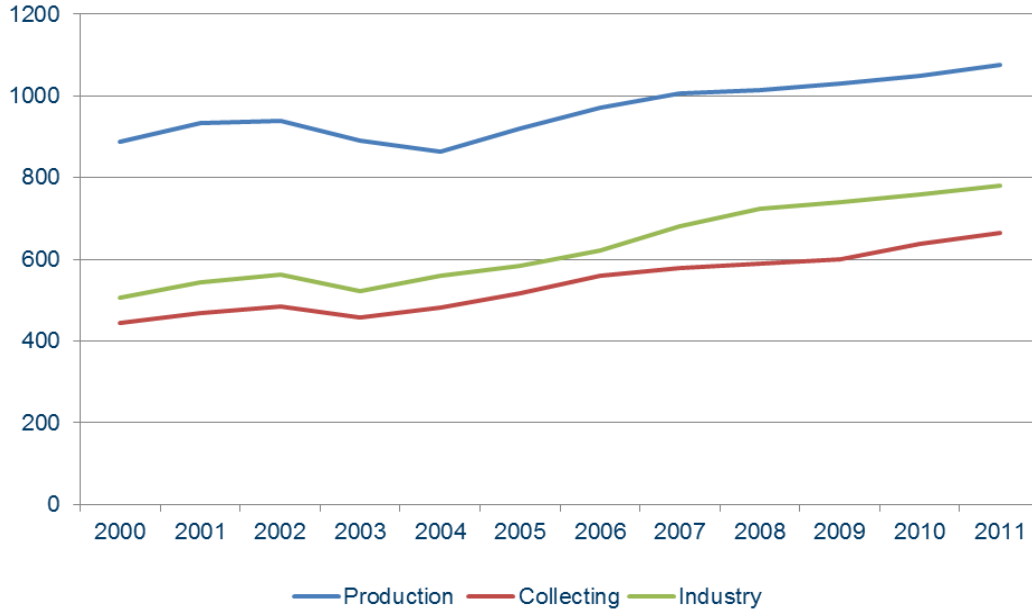
- a unit owned by the Délice-Danone Group at Sidi Bouzid, with a processing capacity of 450,000 litres/day;
- Natilait at Unique (Governorate of Bizerte), with a processing capacity of 100,000 litres/day.

Deregulation affecting the dairy industry has had adverse consequences for STIL, which has had to deal with mounting problems. These include the steep decline in its market share, its 3 production facilities being under-utilised, the structural lack of liquidity and short-term credit options, etc. The drying-up of internal finances weakened the collection centres' capacity for negotiation. The latter recorded a sharp drop in the reception of fresh milk compared to their theoretical capacity and to their competitors, which resulted in forced and unwelcome decrease in production. The worsening financial situation was simply the result of a combination of these factors, themselves at the root of the company's colossal debt (Tustex, 2005). The decision to put it into liquidation after 44 years of existence was taken at the last ordinary general meeting held in January 2005. Délice Danone now occupies the position of dairy products leader in Tunisia with a 67% share of the market and 60% of installed capacity.

The graph below sums up the comparative evolution of production, collection and quantities of milk received by the processing industry.

Graph 5: Production, collection and industrial milk processing

Units: Millions of litres



1.2.3. Consumption and external trade

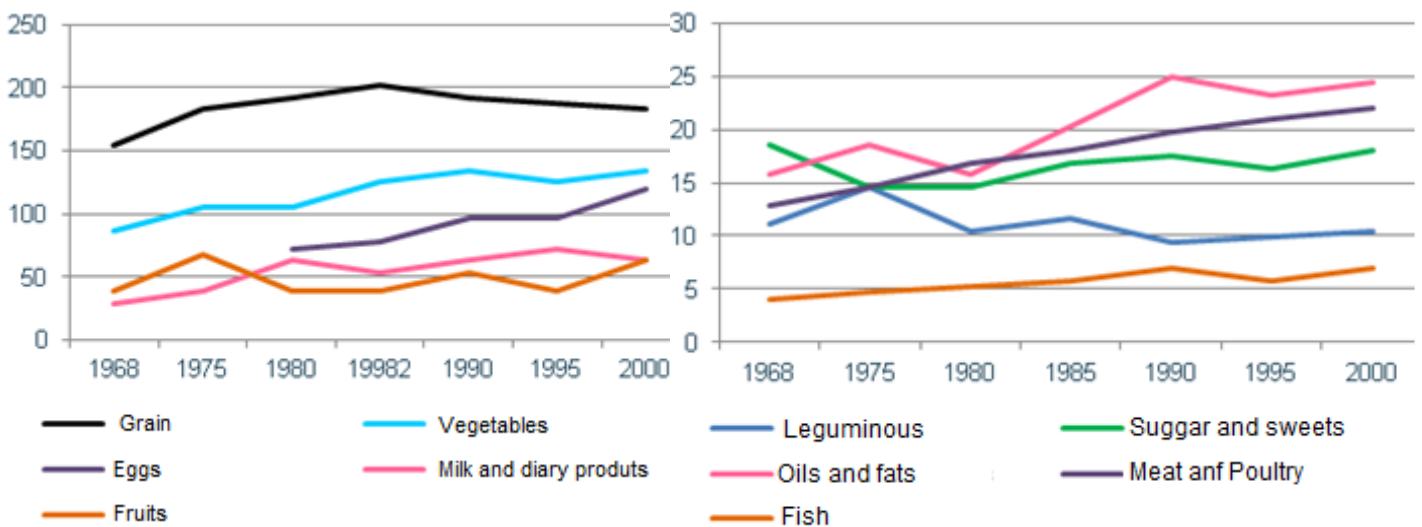
MAIN TRENDS: MILK AND DAIRY PRODUCT CONSUMPTION

Tunisian food intake is still largely based on cereal products, which make up around half of energy input. Their consumption has nevertheless seemed to be falling since the mid-1980's, with rising consumption of so-called "rich" products, which are gradually replacing basic products.

The more varied food intake is typified, more than anything, by a marked increase in the consumption of animal products such as meat, eggs and dairy products whereas the consumption of vegetables and fish remains stable.

Graph 6: Changes in consumption of the main food groups in Tunisia 1968-2000

Units: kg/pers/yr



Source: INS data, national surveys on the household budgets, consumption and standard of living (<http://www.nutrition.rns.tn/alimentation/situation.htm>)

Milk and dairy product consumption has grown steadily since the 1990's. It rose from 83 to 96 litres/person/year between 1994 and 2004 and subsequently reached 110 litres/person/year in 2012. Consumption, however, is still characterised by strong seasonality, inverted compared to that of production. Indeed, the period of peak consumption (September to February) coincides with low production, whereas the period of low consumption (March to August) coincides with high production (lactation).

In addition, peak consumption for dairy products is recorded during Ramadan. According to the National Institute of Statistics, the consumption of milk and milk-based products experiences a rise of more than 70% during the months of Ramadan. This steep rise is due to the fact that dairy products represent a vital ingredient and an essential product during this month because of their nutritional contribution and their use in several traditional recipes.

A detailed analysis on the consumption of dairy products highlights 4 main characteristics (Khaldi, R., Naïli, A., 2001):

- a large gap between urban and rural areas, explained by the low consumption of dairy products in rural areas (3 times less than in urban areas);
- a clear increase in average yoghurt consumption;
- increasing cheese consumption, although this remains a luxury product with large disparities between the regions (in the order of 1 to 8 between the centre-west region and the district of Tunis);
- consumption disparities between socio-professional categories (considerably greater with executives and senior independent professionals).

With an average of 110 litres of milk and dairy products, a Tunisian's annual consumption is on a par with that of an Algerian and above that of a Moroccan, which is around 55 litres. However, this consumption is still low compared to countries on the northern shores of the Mediterranean.

CONSUMPTION BY PRODUCT TYPE (FAO 2011)

National consumption of **industrial drinking milk** was about 428,000 tonnes in 2010, i.e. an increase of around 10% compared to 2001. Average individual consumption is 40.3 litres, a quantity which has been stagnating since 2005.

Individual **yoghurt** consumption has risen from 35 to 51.3 pots per year between 2000 and 2010, i.e. a rise of 46% in 10 years. It is important to point out that it was in the range of 20 pots per year at the beginning of the 1980's. Yoghurt consumption really took off with the introduction of the national dairy strategy and the increase in milk production. It rose with changes to the product range and a more diverse offer, which stretches from natural yoghurt to exotic fruit yoghurts.

Average consumption of **butter or Smen** has virtually stagnated to about 1 kg per year since 2000 following a period of steady growth (the level was 0.4 kg in 1985).

Average **cheese** consumption per inhabitant did not exceed 200 grams per year at the beginning of the 1980's. Today, it is nearly 800 grams. The very low level of cheese consumption is due to its high price (raw material costs and quality, 18% VAT, etc.). The cheese market still needs to be developed, especially with changing consumer patterns and increasing incomes.

CHEESE: A SEGMENT WITH HIGH POTENTIAL

Cheeses produced in Tunisia fall into 4 main categories (PMI/ API, 2009):

- fresh Feta-type cheeses in brine produced from cow's or sheep's milk, or a mix of both;
- pressed Gouda or Saint-Paulin-type cheeses, mainly represented by Kaiser;
- processed cheese produced from other cheeses, milk powder, butter, etc.;
- cheese specialities, blue cheeses, soft cheeses and soft ripened bloomy-rind cheeses (still marginal).

Consumption is particularly low, without doubt one of the lowest among the Mediterranean countries. This difference flags up significant scope for growth and points to promising segments and investment opportunities for Tunisian companies.

For example, consumption of milk and dairy products in France is 305 kg, including 78% of milk-based products and 40% of cheeses.

Table 12: Consumption of milk and dairy products in France (2009)

Products	Consumption (kg/yr/inhabitant in milk equivalent)	Share of total (%)	Consumption (kg/yr/inhabitant)	Share of total (%)
Cheese	122	40	24	44
Liquid milk	67	22	67	13
Ultra fresh	49	16	35	32
Butter	49	16	8	6
Cream	18	6	6	5
Total	305	100	140	100

Source: Our own calculations using data (France AgriMer, 2009) according to Nielsen

Dairy products represent 47% of purchased volumes, but 78% of consumption when expressed in milk equivalent and 87% of household expenditure. Milk, which takes up half of the volumes, only relates to 13% of money spent. French households buy nearly 98% of their dairy products from supermarkets and hypermarkets. With cheese consumption standing at 24 kg/inhabitant, France comes second behind Greece (30 kg/inhabitant) and just ahead of Denmark (23 kg/inhabitant) and Italy (22.6 kg/inhabitant).

A 2011 study by the Organisation for Economic Cooperation and Development (OECD) and the Food and Agriculture Organisation of the United Nations (FAO) confirmed the growth potential of dairy products in Tunisia by noting that “increasing population and income, together with the growing popularity of dairy products, particularly among developing country consumers, is a key factor behind strong demand in the medium term. Demand continues to be encouraged by the growing influence of retail chains and multinational companies in these countries, which are facilitating improved consumer access to dairy products [...] The demand for milk and dairy products is expected to remain particularly strong in important developing dairy markets such as North Africa, the Middle East and East Asia”. Such an outlook is still dependent on changes in household purchasing power and the quality of products on the market.

In addition, cheese production presents several advantages. It makes it possible, in particular, to:

- create greater added value in the dairy sector;
- address the problem of seasonal surpluses;
- facilitate exports due to the shelf life of cheese;
- broaden consumption models by offering products tailored to consumer tastes.

EXTERNAL TRADE

Since the end of the 1990's, despite reaching a state of self-sufficiency, the dairy industry is still very unstable and has experienced successive periods of gluts and shortages. As a result, Tunisia continues to receive ad hoc imports such as 10 mln litres of milk in 2002 and 15 mln litres at the end of 2003.

The rate at which exports have offset imports has continued to rise since the dairy strategy was introduced in 1994 and updated in 1998. It rose from 96.4% between 2000 and 2011 to total coverage in 2007. This improvement is due to a bigger rise in exports (+249%) than imports (+77.8%). As previously mentioned, increased milk production has enabled local requirements to be met as well as building up a reserves of milk and dairy products, partly destined for export.

Table 13: Changes in exports and imports of dairy products 2000-2010

Units: millions of litres

Source: National Institute of Statistics (INS)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Rate of growth 2000-2010 (%)
Exports	11.7	10.8	13.9	9.6	12	21.4	27	49.2	42.2	40.2	40.9	250
Imports	28	29	34.8	41.	52.9	44	36	49	79.5	44.4	49.8	77
X/M in %	41.8	37.2	39.9	23.4	22.6	48.6	75	100	53	90.5	82.1	96.4

The main imported products are drinking milk, concentrated milk, butter and cheeses, mostly destined for melting. Exports mainly concern drinking milk, cheese and yoghurt. Most exports are to neighbouring markets. In 2011, 94% of dairy product exports were destined for the Libyan market.

The main trading product is still drinking milk. Over the period 2000-2010, 51 mln litres of drinking milk was imported compared with 32 mln litres for export, making a deficit of 19 mln litres. This deficit is insignificant when compared with national production of drinking milk (0.4% over the period).

1.3. Public policies and stakeholder strategies

1.3.1. Diagnosis and guidelines

Several studies based on field surveys and a large number of scientific articles have been devoted to the dairy industry. This work has made it possible to identify strengths and weaknesses in the industry as well as challenges which it must face. They have also put forward strategic guidelines likely to improve the way it operates.

It is helpful to draw some lessons from this body of work and compare it first to analyses conducted in the preceding chapters and then to the results of the survey undertaken with dairy industry stakeholders in the region of Bizerte.

The growing demand for dairy products fuelled by demographic growth, urban development and people's improved purchasing power raises several challenges, the most important of which are:

- greater availability of fodder, both in terms of quantity and quality;
- genetic improvements to the dairy herd and improvements in its performance;
- organisation of the industrial circuit such as integrating hawkers, improving the quality of milk throughout the industry, fraud control, etc.

SHORTAGES IN FODDER AVAILABILITY BOTH IN TERMS OF QUANTITY AND QUALITY

Cattle feed supplies constitute a key structural constraint for livestock farming in Tunisia. Fodder production nationally has changed very little and has not followed the rapid increase in cattle numbers. In addition, many farms, especially small and 'landless' farms, systematically buy it in whereas large farms find it more economical to sell hay rather than keep livestock. There is therefore a split between producers and consumers of hay (Kayouli, C., Forage Resource Profile).

Average annual production of local resources destined for feeding the national herd is around 3,800 mln fodder units (FU) and can be broken down in the following way:

Table 14: Contribution of different food resources to herd requirements

Type of food resources	millions of FU	%
Grazing	1,360	35
Agricultural and agri-industrial by-products	1,290	34
Fodder crops	715	19
Cereal grains and pulses	465	12
Total	3,830	100

National production covers approximately 76% of herd requirements. The fodder deficit is around 1,200 mln FU in an average year, i.e. 24%. In the rainy season, this rate can drop to 10%, but can reach 50% in a dry year. To deal with this situation, it is important to simultaneously expand surface areas reserved for fodder production and improve the productivity of these surface areas.

In addition to this quantitative shortfall, the Tunisian fodder system suffers from a lack of diversification and mediocre quality. Dry fodder is mostly made up of oat-vetch hay and yields are often poor.

The quality of the feed ration drops with the aridity of certain regions in the country. In the north, where most of the large dairy farms are found, grass and silage are available all year round. Supplementary feed concentrates are entirely destined to cover the production requirements of cows. In the centre and south, 'landless' livestock farms predominate and concentrated feeds partly supplement basic feed rations (hay, straw, cacti, etc.) to cover cattle maintenance, growth and gestation requirements. Since 2004, the public authorities have influenced cattle imports by restricting buyers to those possessing cowsheds capable of accommodating a minimum of around 30 cows (Tunisian dairy blog, 2007).

Livestock farmers are constantly faced with rising prices for local or imported fodder products, which have a direct impact on the production cost of milk. The rising price of fodder, particularly during 2008-2009, resulted in some farmers abandoning their cattle and explains the drop in cattle numbers observed during the period

2008-2011 (Gharbi, C., 2012). Corn silage could help improve the quantitative and qualitative output of fodder.

Shortfalls in fodder availability and its poor quality have led to increased use of concentrates for ruminants, especially dairy cows. Subsidies allocated to raw materials used in concentrates have encouraged the growth of combined (or all-in-one) feed production units. They currently number 190 and mainly use imported raw materials (Gharbi, C., 2012). Corn and soya meal is entirely imported whereas imports of barley vary considerably according to weather conditions, rising during periods of drought. The country also imports hay and alfalfa.

Milk production in Tunisia has therefore become increasingly dependent on the availability of imported raw materials and fluctuations in their prices on international markets. The development and promotion of fodder resources is one of the main remits of the Office of Livestock and Pasture (see Appendix 1).

Proposed guidelines to improve feed resources focus on 3 key priorities:

- Limit the misuse of concentrates and develop fodder crops both on un-irrigated and irrigated land by expanding surface areas and developing more productive varieties of fodder that deliver the best production costs/ nutritional value ratios;
- Optimise by-products from agriculture and the processing industry and use them in cattle feed by encouraging research in this subject area and designing balanced feed rations using by-products (olive cakes, downgraded dates, pomace, straw, bran, etc.);
- Boost extension programmes on fodder farming techniques and feeding methods for dairy cows.

Special attention must be given popularising the use of fodder and the nutrition of cows as it forms a complex system due to the wide range of raw materials used and the large number of stakeholders involved. Cattle feed constitutes a chain in which the successive links are strongly interdependent and require very varied methods of fodder production, silage-making, drying, storing, making-up feed rations, animal nutrition and milk production.

For quite a while now, it has been accepted that “the speed of progress in the complementary, fodder and cattle sectors is much slower than in other branches of farm business activities” (Rouche, E., 1968).

DISPERSION AND POOR PERFORMANCE OF LIVESTOCK FARMS

Low cow productivity, largely due to the poor quality of feed rations and small herd size, is considered to be the main constraint in the dairy industry.

Poor production performance is also attributed to several other factors:

- large numbers of local breed cattle, which are better adapted to their surroundings but are less productive;
- the low impact of genetic improvement and animal breeding programmes: insufficient coverage for artificial insemination, very limited and inadequately developed performance monitoring programmes, lack of genetic improvement programmes for indigenous breeds;
- the limited financial resources of livestock farmers preventing them from making technical improvements and developing their business;
- the poor grasp on production techniques in relation to modern technology for enhancing feed resources and livestock management methods;
- the low rate of supervision, especially with small and medium-sized livestock farmers;
- the poor professional organisation of small livestock farmers: farmer membership rates to mutual agricultural service companies (SMSA) and agricultural developing groupings (GDA) are 8%;
- delays in payments to farmers due to the financial difficulties of some collection centres and/or central dairies;
- the low impact of extension programmes on rational livestock management and hygiene techniques.

FRAGILITY AND WEAKNESSES OF THE INDUSTRIAL CIRCUIT

The industrial circuit concerns milk collected by collection centres and distributed to factories as well as milk which is delivered to them directly. Thanks to the remarkable development of the collection network, more than 70% of national raw milk production goes through the industrial circuit.

The informal circuit therefore accounts for about 30% of production. Milk collection is mainly undertaken by hawkers who collect the milk directly from the farmers to then sell it on to users such as artisanal processing plants, bakers and cafe-owners, or directly to consumers. These parallel processing circuits are not demanding in terms of quality and no controls are carried out either (density or acidity).

Most of the problems in the industrial circuit are due to the fragile nature of contractual relations between the various stakeholders in the chain, when they exist, and a large disparity in the balance of power.

During high production periods, the competition between the central dairies leads them to award large discounts and facilities for payment to distributors who profit from this situation and make significant margins. This is why several central dairies (particularly Beldi and Sers) had to suspend payments and file for bankruptcy while others continue to suffer from financial difficulties. This situation has repercussions on:

- collection centres, which cannot pay the producers or pay after long delays; producers are then forced to sell their milk to hawkers;
- milk quality and consequently, the development of dairy products such as cheeses.

The industrial circuit's frequently highlighted weaknesses can be summarised in the following way:

Regarding collection

- poorly-mastered techniques and hygiene relating to collection that meet neither product specification requirements nor sanitary certification⁷;
- collection subsidies based on the volume of chilled and manufactured milk, irrespective of quality;
- the lack of a standardised quality-based milk payment system;
- the under-use of installed capacity (utilisation rate of about 70%).

Regarding processing

- the lack of traceability of milk supply, 80% of which comes from collection centres;
- under-used capacity in the central dairies (utilisation rates of around 65-70%);
- insufficient installed chilling capacity compared to volumes processed;
- the lack of quality certification systems (health certification, ISO, HACCP, etc.);
- the capping of the retail price for UHT semi-skimmed milk (low added-value);
- the high proportion of packaging (Tetra-pack type) in the cost price (25% compared to 10% in Europe);
- the lack of a distinctive quality mark for dairy products;
- the mediocre quality of fresh milk, particularly in bacteriological terms, which prevents a broader range of processing, especially for producing cheeses;
- deficiencies and irregularities in the system for controlling fraud.

There is a big gap between the leading and small companies in the processing sector (PMI/ API, 2009). Small units still display many weaknesses such as the lack of a business plan, of industrial and marketing strategies, of robust management, of staff empowerment and of specifications, poor supervision, ignorance of good manufacturing practices, etc.

Regarding distribution and consumption

Distribution channels for milk are strongly linked to the structure of livestock farming. With herds being very small and dispersed, distribution is artisanal in nature and fragmented. As such, it is difficult to maintain the cold chain and guarantee storage that meets the needs.

However, all collection centres are equipped with refrigerated tanks and chilling is either in place at the farm or in the form of collective refrigeration tanks. In many cases, large dairy farmers also have tanker trucks.

The main weaknesses in distribution can be summarised as follows:

- the existence of parallel disorganised and uncontrollable distribution circuits;
- the low quality standard requirements of the parallel circuits;

⁷ Decree by the Ministry of Agriculture and Hydraulic Resources of 26 May 2006

- the continuing low proportion of hypermarkets and supermarkets in the retail of milk and its by-products;
- the disconnection between the cycles of consumption and lactation that can generate shortages (from September to February), or production surpluses (from March to August);
- peak in consumption during Ramadan causing considerable shortages when it occurs during the low production period.

MAIN GUIDELINES PROPOSED

The main guidelines for the dairy industry strategy are summarised through the following priorities:

- encourage the formation of larger-sized herds by promoting a spirit of mutual benefit, developing networks, strengthening professional organisations and adopting appropriate incentive-based measures (loans, technical assistance);
- develop pure breed cattle numbers (born in Tunisia) and improve artificial insemination services and performance monitoring;
- improve health care coverage of the herd by encouraging vets to set up practices and developing epidemiology surveillance networks;
- improve livestock farming conditions by boosting the level of farm supervision and training for farmers;
- encourage the creation of specialised professional organisations;
- clean up the financial situation of the central dairies to ensure farmers are paid quickly;
- study the possibility of liberalising the price of milk;
- pay out subsidies on the basis of results from checks and their compliance with specifications to favour quality and protect the most vulnerable companies;
- improve overall conditions of hygiene and milk quality by raising-awareness campaigns and the setting-up of a uniform quality-based milk payment system;
- introduce a milk quality control system from the farm gate to the consumer by strengthening technical, hygiene and health checks in the collection centres (HACCP process);
- develop of policy to prevent and fight fraud.

1.3.2. Dairy industry development policies

THE DAIRY STRATEGY

The outstanding performance of the milk and dairy industry over the last 25 years was driven by a national integrated support and promotion strategy for the entire industry introduced in 1994. An analysis of changes in the industry makes it possible to distinguish 3 main periods (Al Efrif F, Hassainya J, 2001):

- Before 1986: generalised milk deficit and State monopoly of collection and processing;
- 1986-1994: structural adjustment of agriculture coupled with a certain start-up of the sector;
- After 1994: implementation of the national strategy to develop the sector and steady growth in performance at all level of the industry.

With the introduction of quotas in Europe and the increase in the price of milk powder, paid for in foreign currency, the Tunisian State decided to review its policy by substituting imports of milk powder with local fresh milk production. A dairy strategy was launched in the late 1980's, reinforced in 1994 and updated in 1998 as part of an overall strategy to develop agri-food industries.

This strategy helped reach self-sufficiency in milk by 1999, 2 years before planned thanks to a series of incentive-based measures centred on the following priorities:

- steady growth in production;
- promoting productivity;
- organising the industry;
- improving quality.

The introduction of this strategy was based on the following mechanisms (ONAGRI, 2002):

- encouraging local production of pure breed heifers to reduce live animal imports;
- guiding livestock farmers to mixed-production breeds (milk and meat);
- establishing mechanisms to organise the industry (contractual approach, Animal Husbandry Law, organisation of hawkers, etc.);
- expanding the milk collection network;
- introducing mechanisms to make the most of the high lactation period by forming a buffer stock of drinking milk and creating a milk-drying unit;
- boosting the supervision for farmers and expanding the health coverage of herds;
- developing fodder resources and introducing a specific programme to safeguard the herd in difficult periods;
- guiding efforts to improve productivity and quality;
- bringing the price of milk up to date with production;
- granting subsidies for the consumption of industrial milk;
- introducing protective measures for national milk and dairy production (imposition of a 233% customs tax on imported cheese).

These measures and mechanisms helped reach self-sufficiency in 1999 and to generate a surplus, which supplied a drying unit as well as exports as of 2000.

THE AGRI-FOOD INDUSTRY DEVELOPMENT STRATEGY

The development strategy for the agri-food industry introduced in 1999 targeted growth of the sector by encouraging companies to:

- be more competitive on local and international markets;
- produce quality products with higher added value;
- offer specific products with Tunisian labels;
- develop exports.

This strategy is based on the following priorities (APII/CEPI, 2011):

- a gradual liberalisation of trade in inputs and finished products;
- the increase and diversification of agri-food production to raise the use of installed industrial capacity and the added value of the sector, as well as to satisfy market requirements, both locally and internationally;
- the modernisation and restructuring of the sector by upgrading agri-food companies, introducing new technology, promoting quality, traceability, certification and adapting the HACCP process (creation of a fund to restructure the sector, incorporated into the Competitiveness Development Fund - FODEC) ;
- the development of technical and commercial partnerships;
- the development of adequate storage facilities for agricultural raw materials to preserve them against any deterioration and collapse in price.

Given the potential that the agri-food industry displays in terms of production, exports, competitiveness and added value, a new strategy to promote the sector was introduced in September 2006. It is centred on 4 main priorities:

- boosting food quality and safety;
- controlling the organisation of processing seasons;
- supporting production and exports;
- promoting partnerships, technological development and networking.

7 products were targeted by specific measures: olive oil, seafood products, dates, wine, canned tomatoes, semi-preserved foods, milk and milk derivatives.

For milk and milk derivatives, the strategy recommends:

- a rise in volumes processed and the promotion of quality;
- the use of bonuses awarded to central dairies to encourage them to play an active part in the implementation of the policy on promoting the quality of milk;
- the adoption of the principles of free exports and liberalised retail prices on the local market in the coming years;
- the introduction of a specific quality standard for milk and dairy products, in compliance with international standards.

As concerns vertical measures affecting all 7 products, we can highlight:

- the upgrading of milk collections to meet specific requirements;
- the development and dissemination of model production contracts and the organisation of transport and supply of agricultural products to the processing units.

An annual average growth of 6.4% is expected for the sector over the period 2007-2016, allowing to create 34,000 industrial jobs by 2016. The sector will therefore contribute to 12% of national industrial exports and 22% of industrial investment.

To meet these strategic objectives, quality label schemes and marketing initiatives for products destined for export will be developed. Enhanced Mediterranean culinary-style promotion, which is increasingly appreciated abroad, could encourage the development of flagship Tunisian products.

Traceability and technical approval are also crucial to the sector strategy with the aim of granting authorisation and certification to 300 and 400 companies respectively by 2016 as opposed to 126 in 2008.

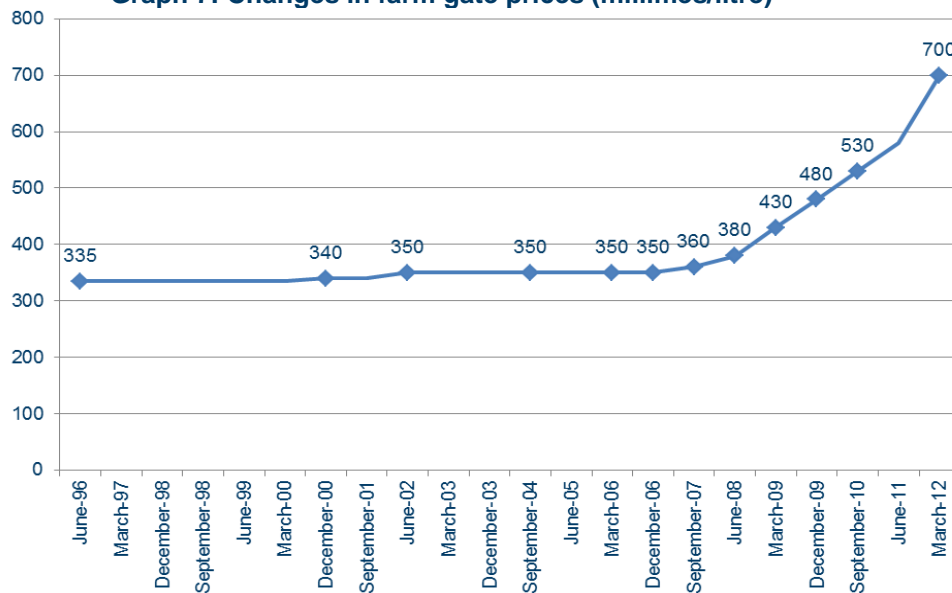
The PCB has been entrusted with a key role to boost the innovation potential in the different subsectors, develop technological partnerships and support business development with the aim of creating 170 businesses and 9,000 jobs by 2016 (APII/CEPI, 2011). 100 existing companies will also be connected with laboratories as well as national and foreign training bodies.

THE SYSTEM OF PRICES AND SUBSIDIES

Although dairy products such as cheese, yoghurt and butter, etc. obey the law of the market, the price of milk is currently still controlled by the public authorities. The latter have adopted a policy that fosters production by setting a minimum price for fresh farm-produced milk.

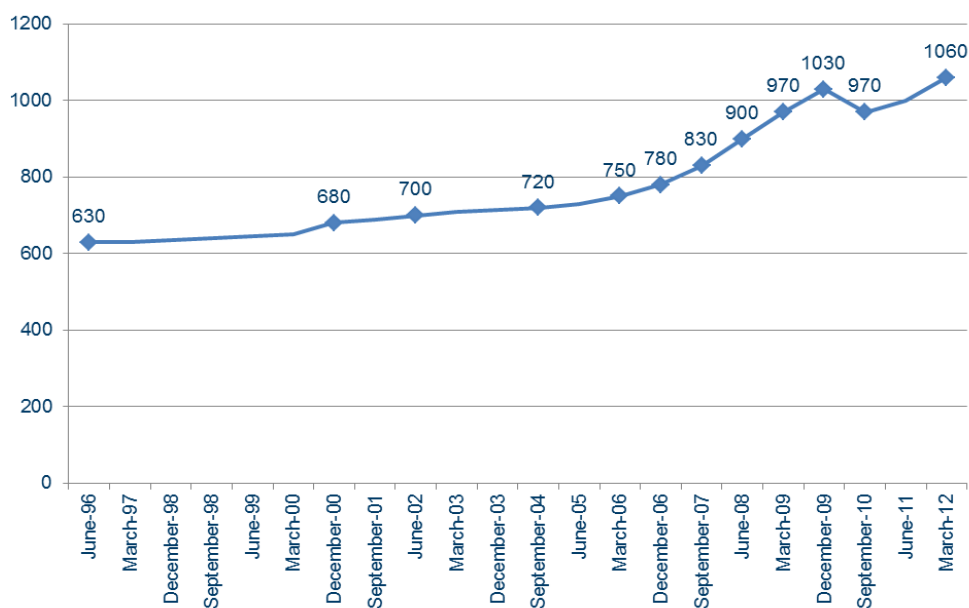
Despite periodic reviews of the farm gate milk prices (see graph below), the price set cannot keep pace with fluctuations in production factors, particularly animal feed which mainly consists of food concentrates (corn and soya). The latter represent 62-70% of total production costs (Kayouli, C., 2012)⁸. In the first quarter of 2012, the average production cost of milk was estimated to be 680 millimes/litre.

⁸ Kayouli C. (2012), "The first steps towards the development of the dairy industry", Presentation SYNAGRI 2012, "الخطوة الأولى الناجحة في " رحلة الألف ميل الوصول بقطاع الحليب إلى الغايات المنشودة من تطوير قطاع إنتاج الحليب و رفع المستوى الصحي و السلامة الغذائية في صناعة الألبان و الأجبان في تونس"

Graph 7: Changes in farm gate prices (millimes/litre)


Source: GIVLAIT

Similarly, despite periodic reviews of the selling price of milk to the consumer (see graph below), the price imposed cannot cover the charges of the various links in the chain (collectors, central dairies, distributors), hence the necessity to maintain subsidies that the strategy of the 1989 structural adjustment plan planned to eliminate.

Graph 8: Consumer price (in millimes/litre)


Source: GIVLAIT

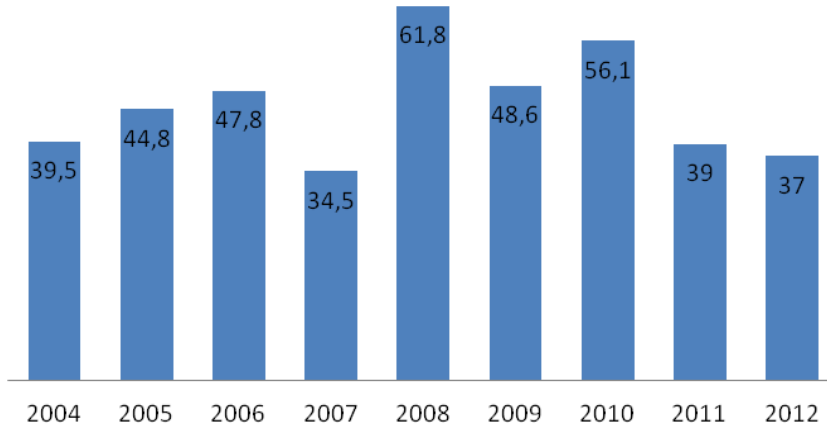
Currently, State subsidies are as follows:

- an operation subsidy of 120 millimes/litre awarded to factories and paid monthly;
- a storage subsidy of 40 millimes per litre of stored UHT milk⁹, paid monthly (this bonus encourages the formation of buffer stocks in addition to mandatory technical stocks, and therefore aims to ensure an annual balance in the sector);
- a subsidy of 60 millimes for collection centres based on quantities collected and received by processing plants (this bonus was 40 millimes prior to July 2012).

⁹ This subsidy should increase to 50 millimes: <http://www.webmanagercenter.com/actualite/economie/2013/05/14/134719/tunisie-recommandations-pour-assurer-l-equilibre-de-la-filiere-laitiere>

The quantities of milk stored and the amount of corresponding subsidies has evolved as follows:

Graph 9: Changes in the storage of UHT milk – Maximum stock (in millions of litres)



Source: GIVLait

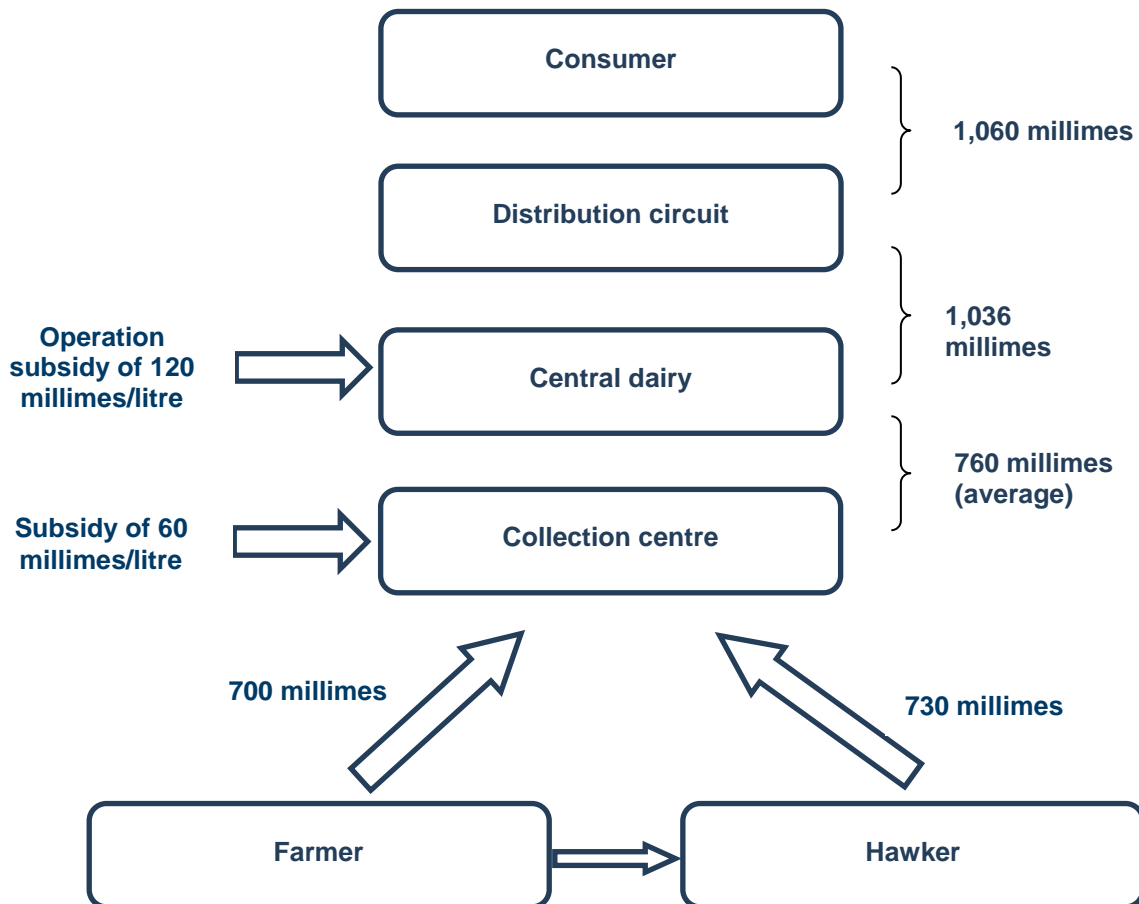
Table 15: Storage subsidies

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Storage subsidy (MD)	4	7.5	8.5	5	11.5	10	12	3.5	4

Source: GIVLait

The following diagram summarises the milk pricing taking into account the various subsidies:

Diagram 3: Milk price formation



1.3.3. Support programmes for research and innovation

Since the end of the 1990's, the research and innovation sector has undergone major change in relation to:

- the enactment of several laws, pieces of legislation and international agreements¹⁰;
- the implementation of several cooperation programmes.

“However, despite this momentum, the sector's participation in introducing a developed technological base and creating a successful partnership between the production sector and research institutions remains limited and insufficient. Indeed, the Tunisian economy is today at a turning point in its development, characterised by a clear desire to support the upscaling of production facilities with a view to repositioning them in high value-added niches” (European Commission, 2007).

The PASRI project of support to the research and innovation system, launched in 2012 aims precisely to use the lessons learned from experiences conducted by similar programmes already undertaken in Tunisia and other Maghreb countries and lay the foundations of a “modern knowledge-based economy to bring Tunisia into the information and knowledge society” (PASRI, 2011).

It is therefore important that future projects use the gains made from previous projects to pursue and accentuate the process already underway and to create synergies.

DONOR PROGRAMMES IN TUNISIA

▪ **The Industrial Modernisation Programme (PMI)**

Implemented from November 2003 to March 2010 with a budget of EUR 50 mln (donation from the European Union), PMI's main aim was to contribute to upgrading efforts already underway in Tunisia following the signing of the Association Agreement with the EU. Its purpose was to facilitate the introduction of Tunisian SMEs into the Euro-Mediterranean Free Trade Area by enabling them to make non-material investments, by making innovation and competitiveness tools available to them and by assisting them in setting-up quality-based procedures vital to deal with the competition from foreign products.

PMI also provided support to create two financial institutions for SMEs: SOTUGAR, the Tunisian Guarantee Company and BFME, the Bank of Financing of SMEs. Both organisations bolster the range of mechanisms in place to develop and support SMEs at critical stages of their life cycle (creation, expansion, innovation projects).

▪ **The Enterprise Competitiveness and Market Access Facilitation Support Programme (PCAM)**

PCAM took over from the PMI when it finished in 2010. With a budget of EUR 23 mln, its overall aim is to facilitate the access of Tunisian companies to the international market, especially the European one, by improving their commercial, managerial and technical performance.

▪ **The Association Agreement Support Programme (P3A II)**

P3A is part of the European Neighbourhood Policy (ENP), and more precisely the European Neighbourhood Partnership Instrument (ENPI), and ties in with P3A I. With a budget of EUR 30 mln (EU funding), the purpose of this programme is to facilitate the implementation of the Association Agreement with the EU and the Tunisia ENP Action Plan by offering administrations and public institutions twinning arrangements with similar organisations in Europe. It also provides technical assistance and tailored working tools.

P3A II's 3 main priorities for intervention are:

- reinforcing the integration and consolidation of competitiveness;
- supporting sector-based policies on integration;
- consolidating social benefits and sustainable development.

▪ **The National Programme of Technology and Competitiveness Clusters**

As part of the MEDA programme, the European Investment Bank (EIB) allocated EUR 1.5 mln to Tunisia to fund 5 technology clusters, including the Bizerte Agri-Food Technology Cluster. Technical and financial assistance from the EIB covers 5 areas:

- the competitive positioning of technology clusters both nationally and internationally;

¹⁰ Framework Law on scientific research and technological development (1996), Specific Scientific and Technological Cooperation Agreement with the EU (2003), Premium for Investment in R&D (PIRD), Research Results Promotion Programme (VRR), National Programme of Research and Innovation (PNRI), Technical Cluster and Business Incubator Programme.

- the operating method for the various components making up each technology cluster;
- the definition and implementation of a marketing strategy;
- the definition of a cross-cutting study for the development of technology clusters and their various components;
- synergies between the technology cluster's various components.

▪ **The Invest in Med Project**

The Invest in Med project was launched by the EU as part of its ENP to develop foreign direct investment and enterprise partnerships in the Euro-Mediterranean region. It ran from 2008 to 2011 and had a budget of EUR 12 mln, with 75% co-funding from the EC. It was managed by the MedAlliance Consortium, which is a Euro-Mediterranean network representing the private sector and organisations supporting economic development in the region. During the 3.5 years of the project, Invest in Med launched 48 initiatives to boost strategic sectors for the economic development in the Mediterranean. 4 of these aimed to modernise the agri-food sector.

▪ **The Entrepreneurship and Innovation Support Programme (PAEI)**

PAEI was implemented by the GIZ over the period 2008-2012 with the aim of:

- boosting the innovation process by the transfer of technology between universities, research centres and private businesses and by introducing a policy to foster innovation (innovation scoreboard, innovation-based services, etc.);
- support for the creation of new businesses, particularly through developing local expertise in innovation management systems.

▪ **The Programme for Creating Innovative Enterprises in the Mediterranean region (PACEIM)**

PACEIM is jointly implemented by the French Institute for Research & Development (IRD) and Marseille Innovation, together with key innovation players in Southern Mediterranean countries. Its purpose is to muster expertise from scientific and technical diasporas north of the Mediterranean for the benefit of their countries of origin. By supporting and accompanying projects to create technology-based businesses, it fosters economic development based on technology and innovation in the Southern Mediterranean.

PACEIM provides support from French laboratories, schools and universities in all business sectors to technology business start-up ventures in Algeria, Morocco, Libya and Tunisia. The programme issued its third call for projects in 2012 and offered up to EUR 35,000 of financial assistance per project as well as one-to-one support per national incubator in both the North and the South.

Despite this momentum, benefits from the aforementioned programmes are mixed in the agri-food sector. This can be explained by missing links in the innovation chain (such as seed funds), a lack of a shared vision and common strategy, a lack of understanding about forms of organisation and a lack of coordination between those involved in the innovation system, etc.

PASRI - SUPPORT TO RESEARCH AND INNOVATION SYSTEM (2011-2014)

With EUR 12 mln funding from the EU over 4 years, PASRI aims to provide solutions to the problems of the various players in the innovation chain. The process starts with the company, which is directly linked to the consumer and employment markets, and ends with the research unit, that gathers scientific and technical knowledge. It also involves a range of institutional, administrative, financial, technical and academic partners supposed to support the transformation of technical knowledge into a tangible product or service.

PASRI is centred on 3 complementary priorities:

- **governance:** to strengthen governance mechanisms in the National System of Research and Innovation (SNRI) governing relations between institutional stakeholders, research establishments and businesses;
- **interfacing:** to galvanise the research and economic communities and their interfaces to foster better connections and develop project relations between stakeholders geared to meeting sector priorities and business needs as well as to promote innovative projects;
- **networking:** to develop networking activities both nationally and internationally and to boost Tunisia's capacity to be part of European research programmes.

Key actions undertaken as part of these 3 priorities can be grouped into 2 main categories:

- anchor projects designed to lay the foundations of the SNRI, including:
 - analysis of the governance of innovation and the development of an action plan to organise and manage it;
 - assessment and support to financial instruments dedicated to innovation;
 - training for new professional profiles of transfer and commercialization;
 - virtual networking of SNRI stakeholders and building-up contact points for European programmes and networks dedicated to research and innovation.
- Seeding activities closer to the economic world that act as a catalyst for collaborative links between SNRI stakeholders by:
 - capacity-building in the main organisations tasked with promoting research and innovation by introducing a management system for innovation to a sample of 200 companies (with a stand-alone budget of EUR 2 mln managed by the GIZ) ;
 - mobility of researchers and engineers between research and industry as part of the MOBIDOC Programme (reserved for 100 PhD students and with a budget of EUR 2.2 mln);
 - formation of sector innovation networks and clusters to galvanise relations between stakeholders;
 - technical assistance for setting-up a Technology Transfer Office (BUTT) whose purpose is to facilitate the creation of technology-orientated innovative businesses and to provide researchers, young developers and innovative industrial companies with easy access to information required to create and develop their projects.

A CLUSTERING PROCESS IN ACTION¹¹

The clustering of activities throughout the country forms an important part of the 2016 Industrial Strategy. Clustering constitutes a driver for growth chosen by Tunisia to anchor innovation and added-value in sector development strategies. It consists of setting up competitiveness clusters dedicated to flagship sectors (agri-food, mechanical and electrical engineering, textiles, leather and shoes, ICT). The clusters are programmed to be close to industrial clusters and national higher education, training and research facilities. The clusters have also been designed according to a networking approach (APII/UTICA, 2008).

In Tunisia, “the concepts of industrial districts, clusters and export consortia have been promoted since the mid 1990’s. However, these concepts have been viewed as ill-adapted to the specific culture and history of the country, with Tunisians having painful memories of the interventionist experience of ‘forced’ cooperatives in the 1960’s” (Chaabane, T., 2009).

Following the success of some export consortia started in the 2000’s and, above all, faced with the urgency to reduce territorial fragmentation, there has been a rise in projects incorporating the “economic networking” approach as a tool for competitiveness and regional development.

However, the introduction of networked collective organisations is a difficult and delicate business which encounters a large number of obstacles. The risks of failure are very high and several projects have never reached maturity. The main difficulties encountered are linked to the individualistic behaviour of partners as well as doubts and uncertainties about the results of collective initiatives. Other obstacles are often quoted to explain the failure of projects such as poor understanding of the cluster concept, the lack of a culture of cooperation, small financial contributions from members and an inadequate, or ill-adapted regulatory framework, etc.

In such circumstances, the main prerequisite is the power to convince businesses and support structures of the benefits resulting from working together.

¹¹ Title borrowed from the APII/UTICA report, *Stratégie industrielle nationale à l’Horizon 2016*, 2008.

Study to establish innovation networks (clusters)

In partnership with PMI, APII launched a study for the creation of innovative clusters in 3 business sectors (textiles and clothing, agri-food and ICT). The first stage of this study based on the assessment of some 50 pilot companies in these 3 sectors resulted in the following findings:

- a genuine interest of the companies for networking and recognition for the fundamental role of innovation in their development;
- the identification of various priorities for the clusters according to the sector. This included pooling resources and reducing production factor costs for companies in the textile, agri-food sectors, as well as networking on knowledge-intensive projects and governance of the cluster for companies in the ICT sector;
- the building of confidence as a prerequisite for setting-up joint projects;
- the definition of priorities for potential cooperation as part of 5 sector workshops and the identification of a 'hard core' of companies for each cluster;
- a comparative analysis of foreign approaches to clusters (France, Italy, Belgium, Sweden, Japan, Dubai, Madagascar), which highlighted the importance of considering the industrial, socio-economic and institutional characteristics of the country;
- the examination of incentive-based measures introduced by public authorities to promote R&D and innovation in enterprise, which has highlighted the fundamental role competitiveness and technology clusters play in developing synergies between those involved in innovation.

Source: APII/CEPI, 2008

2. The dairy chain in Bizerte and Beja

2.1. Identifying the industry

2.1.1. The place of agriculture and the food industry in the Governorate of Bizerte

Because of its natural resources and climate, the Governorate of Bizerte constitutes an economic hub based essentially on agriculture, industry and services.

Agriculture occupies a central place given the size of the Governorate's contribution to national production. Although it only accounts for 5% of the total population (556,000 inhabitants), the Governorate of Bizerte produces 40% of pulses, 37% of artichokes, 33% of table grapes, 28% of tomatoes, 23% of meat, 17% of potatoes, 12% of cereals and 13% of milk. According to a 2004-2005 statistical survey, 31% of farms concentrate on growing cereals, 21% on livestock farming and 16% on market gardening.

The main annual production figures are as follows:

- vegetables: 295,000 tonnes;
- cereals: 190,000 tonnes;
- milk: 132,000 tonnes;
- red meat: 13,000 tonnes;
- poultry: 6,500 tonnes;
- fish: 6,400 tonnes;
- olive oil: 3,000 tonnes.

2.1.2. The dairy chain in the Governorate of Bizerte

Rainfall in the Governorate of Bizerte is relatively high compared to the rest of the country (annual average of 600mm). This annual amount of rain favours fodder production and these crops account, on average, for 28% of the total farm holding area. The Governorate of Bizerte combined with those of Nabeul, Beja and Jendouba represents more than 50% of the cattle herd. 11,800 livestock farmers own more than 87,000 heads of cattle, including 50,900 dairy cows, 26,600 of which are pure breeds (mostly of Holstein descent). The Governorate is also home to 8 cattle breeding centres for pure breed heifers with an estimated herd of 1,900 bred heifers.

With more than 130 mln litres (100 mln of which are collected), the Governorate of Bizerte accounts for 13% of national milk production. This makes the region one of the biggest milk production areas in Tunisia. Despite these satisfactory production volumes, some observers suggest that better exploitation of the fodder production potential would enable even more growth in milk production.

Table 16: Breakdown of milk production according to type of cow

	Number of cows	%	Units: Millions of litres	
			Milk production	%
Pure breed	26,600	52.3	110,742	84.5
Cross breed	16,800	33.0	17,488	13.4
Local breed	7,500	14.7	2,800	2.1
Total	50,900	100	131,030	100%

Source: CRDA Bizerte, 2012

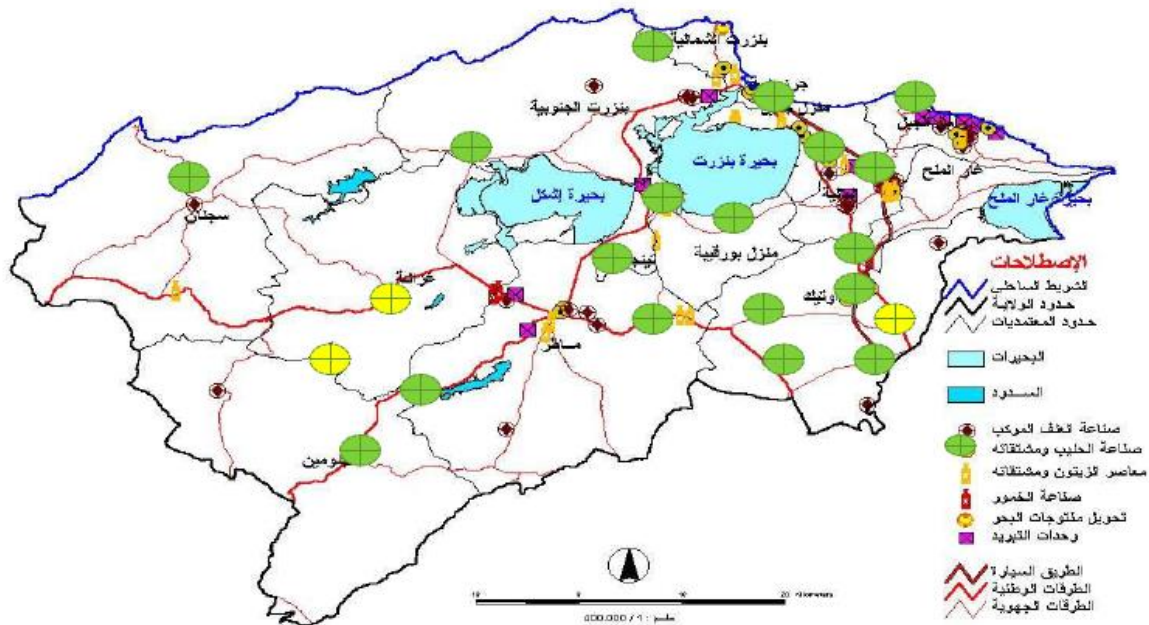
This sizeable production has spurred on the collection sector and the Governorate has 18 collection centres, which deal with 86.15 mln litres of milk, or 65.2% of production. 11.56 mln litres of milk, or 8.8% of production, are also collected by large cattle farmers. In total, the quantity collected represents 74% of the region's production.

The collection centres operating in 2012 were located at Tinja, Bazina, Teskraya, Lezdine, Mrazig, El Azib, El Guaria, Ras Jebal, El Ksir Sejnene, Nouvelle Utique, Beach.hamba, El Brij, Dali, Bechater, Sebat Aouinet,

Sidi Ncir, El Alia and Khetmine. They account for a total collection capacity of 313,297 litres per day whereas the average milk production in the Governorate was 361,664 litres/day in 2012.

Four centres were closed that same year (Mateur, Ousja, Zouaouine and Bejou) and three others secured authorisation (Essamen, El Mabtouh and Ghazala). The map below indicates the geographical spread of the collection centres.

Map 2: Distribution of milk collection centres in the Governorate of Bizerte



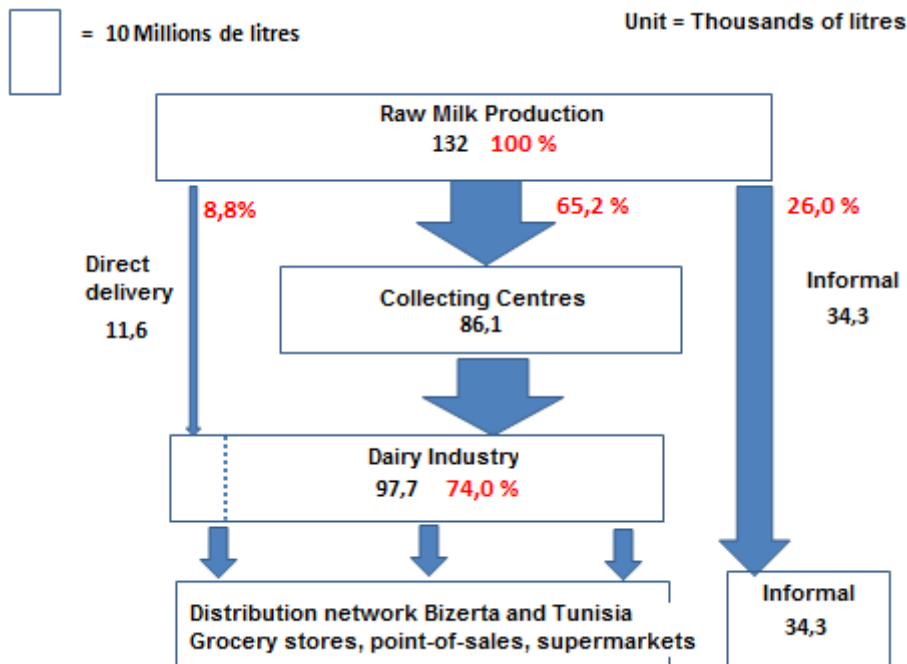
Source: OEP Mateur / CRDA Bizerte

The quantities of milk collected in the Governorate of Bizerte are sent to:

- the central dairy run by the Délice company;
- 5 cheese dairies situated in Greater Tunis;
- 14 cheese dairies in the Governorate of Bizerte, 10 of which are artisanal and 4 industrial (Sotulaifrom at Mateur, Nechma at Ras Jebal, Bouchiba at Utique and Alouche at El Azib).

Small unregistered artisanal cheese-makers also play a part in processing the milk and encourage the growth in consumption of typical dairy products. The specific characteristics and production methods of 5 typical products made from cow's milk from Bizerte are presented in Appendix 2.

Distribution is ensured by a wide and varied network including supermarkets, creameries, grocery stores, milk and dairy product sales outlets, etc. This network is artisanal and dispersed and raises problems for maintaining the cold chain.

Diagram 4: Simplified diagram of the dairy chain in the Governorate of Bizerte (2012)


2.1.3. Sheep and goat farming in the Governorates of Bizerte and Beja

In addition to the production and processing of cow's milk, the Governorate of Bizerte also has sheep and goat farms. In Tunisia, the rearing of Sicilo-Sarda sheep is concentrated in the Governorates of Bizerte (more precisely, towards Mateur) and Beja. This is why the latter, bordering Bizerte, has been included in this part of the study and the survey results. Bizerte and Beja feature sub-humid zones in which rainfall favours the natural pastureland. Goat farming is concentrated in the south of the country and is also present in the Governorate of Bizerte.

SHEEP FARMING IN THE GOVERNORATE OF BIZERTE

In 2011, there were 257,797 sheep in the Governorate of Bizerte, including 3,000 dairy sheep (Sicilo-Sarda), as opposed to 30,000 sheep in 1994-95 (National Agricultural Bank - BNA Bizerte). Milk production is estimated at 200 tonnes (2012), with an average production per head of 67 litres/yr. Sheep farming has developed particularly in the areas of Mateur, Ghazela, Menzel Bourguiba and Bizerte South. Dairy sheep farms include State-run farms, with OTD Ghazala-Mateur (1,200 sheep), UCP Metline (600) and the Fritissa Farm (300) as well as privately-run farms such as Slim Lammouchi (350), Mosbah Amraoui (150) and others (400).

A development project led by the private company SPEA aims to increase the headcount by 500 dairy sheeps by creating a breeding centre for bred ewe lambs and breeding rams, providing assistance to farmers in terms of finance, supplies (animals, fodder seeds) and animal health and developing a cheese dairy with a start-up capacity of 2,000 litres/day.

GOAT FARMING IN THE GOVERNORATE OF BIZERTE

In 2011, there were 44,640 goats in the Governorate of Bizerte (BNA Bizerte). Milk production is estimated at 912 tonnes (2012), or a production of 21 litres/yr per head. Goat farming is concentrated in the areas of Sejnene, Joumine and Bizerte South. Dairy goat farms are privately-run such as that of A. Shiri (Kef Abed). They are extensive-type farms, occupy a marginal place and are not structured as a value chain. With all the goat's milk currently consumed on the farm, it is difficult to estimate the quantities produced and the collection potential. The development of a goat's milk chain would help improve the income of women living in rural areas on which this type of farming depends. It would also enhance goat's milk products and exploit the agro-sylvo-pastoral potential of these areas.

A development project led by the private company GHOZLAN aims to improve herd productivity and introduce dairy breeds (Alpine, Maltaise), to boost milk production (semi-extensive livestock farming) and to

produce organic goat's cheese. It also seeks to promote other goat products by creating an agro-industrial park of slaughtering as well as to package and process goat meat and goat skins. In 5 years, this project, should involve 600 traditional goat farmers (local goats) and 400 new farmers (imported breeds), mostly all rural women.

GOAT FARMING IN THE GOVERNORATE OF BEJA

The governorate of Beja features very varied landscapes, from mountainous areas to grassy valleys and plains. Sheep and cattle farming are well developed here, which has led to the growth in production and consumption of typical dairy products. Sheep's cheese represents a large share of production. Among these cheeses, examples include Sicilian (cooked or fresh), Rigouta, Testouri, etc. The processing of sheep's milk is a technique handed down from father to son and is part of the customs and traditions of the Governorate. Nevertheless, each producer generally adds its own personal touch to the production of one cheese or another and jealously guards the secret. The specific characteristics and production methods of 5 typical dairy products made from goat's milk from Beja are presented in Appendix 2.

2.2. Diagnosis and preliminary guidelines

2.2.1. Diagnosis of the cheese industry by the companies

A survey of industrial companies was conducted as part of the study on the strategic positioning of the Bizerte Agri-Food Technology Cluster. It helped identify the constraints in the dairy industry and to define strategic priorities for its development (Rastoin, J.L., Bencharif, A., 2008).

RECURRENT SUPPLY PROBLEMS

Difficulties and constraints in the supply of milk have been highlighted as one of the biggest problems in the industry, affecting the quantity, quality and prices. Indeed, since 2000, milk production has stagnated or fallen, hence reduced availability for the cheese dairies. The quality is judged to be unsuited in terms of density and acidity and affects productivity in the workshops as cheese production is very sensitive to the physicochemical and organoleptic properties of the milks used.

Finally, the price of milk is judged to be too high and cheese-makers view competition with the central dairies as unfair, particularly in terms of quantities received, prices and methods of payment. In fact, the central dairies have much greater negotiating power with suppliers than the cheese-makers. Hawkers also interfere in this supply system and may be in collusion with the officials of some central dairies to put pressure on the farmers. The central dairies might refuse to take their milk for reasons of poor quality so that they sell it off to these hawkers who, in turn, sell it on to the cheese dairies at inflated prices. The latter claim that these fraudulent practices are quite common in the milk industry.

In addition to milk supplies, those cheese-makers surveyed flagged-up other problems:

- the high prices of additives and milk powder;
- the high investment costs in the sector;
- the lack of a specialised labour force (cheese dairy technicians) and the high wage bill (competition with large cheese dairies).

GROWTH POTENTIAL BUT CONSTRAINTS

The business owners surveyed estimate that the economic fabric in Tunisia is more developed than that of its neighbours and that, in spite of the stated difficulties, there is a growth and export potential which should be unlocked for certain cheeses. However, several weaknesses are mentioned:

- the use of 'informal' products (flavours and caseinates);
- the lack of compliance with quality standards, which penalises the more responsible producers (price);
- the dominant position of a few large companies whereas most companies in the sector are family-run SMEs;
- the frequent use of fraudulent practices at all levels of the industry;
- illicit imports of cheeses and unfair competition.

LITTLE-KNOWN AND POORLY-CONTROLLED MARKETING CHANNELS

The market is not saturated and still represents a big investment opportunity. Although necessary, sales promotion and marketing efforts are still insufficient as most operators seem to be looking for easy gains. They are not mastering modern techniques such as the launch of a brand or listings on shelf space in hyper and supermarkets, when the promotion of their products and the organisation of in-store marketing campaigns would encourage cheese-makers. The weakness seems to lie with consumers who have not yet taken up the European habit of eating cheese on a regular basis.

STRATEGIC PRIORITIES TO DEVELOP THE SECTOR

The priorities identified can be summarised as follows:

Priority 1

- Improve milk quality at all levels of the industry;
- Invest in marketing and sales promotion;
- International development, especially in the Maghreb.

Priority 2

- Organise the industry, especially by eliminating informal production units;
- Undertake studies and research to create new products taking inspiration from foreign techniques and recipes while respecting the tastes and purchasing power of the Tunisian consumer;
- Build the capacity of institutions to support businesses.

Priority 3

- Create protected designations of origin (PDOs);
- Establish a climate of confidence within the industry;
- Promote innovation based on specific regional characteristics and local products;
- Promote commercial brands.

2.1.3. Diagnosis of the pressed cheese niche market

A diagnosis conducted by the Regional Development General Commission (CGDR) of Bizerte and the PCB in 2009 also helped identify the strengths and weaknesses of the Governorate of Bizerte to develop the niche market for pressed cheeses.

STRENGTHS

- Strategic nature of the dairy chain: maintenance of farmers on their farms, agricultural intensification and integration, food security;
- Importance of the dairy chain in the national economy; 35-40% of agricultural GDP, 4-5% of overall GDP and 42.1% of agricultural jobs;
- Growth in on-farm milk production;
- Governorate situated in the north, main agricultural area in the country;
- State intervention in favour of developing the industry: supervision and subsidy of the industry, collection bonuses, health certification for hawkers in place since 2009 to guarantee the quality of collected milk;
- Expansion of the collection network and growth of industrial capacity;
- Use of local milk exclusively and elimination of imports;
- Multitude of small companies and artisanal production units;
- Processing enabling a constant outlet for milk and dairy products;
- Rapid growth in processing: +5.9% per year for cheese, +3.3% for milk and dairy products (+4.5% for yoghurt and +3.1% for sterilised milk);
- National market expanding rapidly: opening-up and steady increase in consumption;

- Wide and varied distribution network: hyper and supermarkets, creameries, grocery stores, etc.
- Growth of the various industry components;
- Export potential, particularly to Libya;
- Dependent increase in quantity and quality.

WEAKNESSES

- Weather affects the profitability of the livestock sector and therefore the supply of milk;
- Under-nourishment limiting productivity and performance of cows raised in Tunisia;
- Ageing and decline in the dairy cow herd due to the soaring prices of imported heifers and cattle feed;
- Mediocre quality of milk due to ill-adapted feed and poor on-farm health and hygiene conditions;
- Supply difficulties representing a risk for returns on investment;
- Lack of quality-based payments;
- Extent of hawking and on-farm consumption;
- Low rate of deliveries to factories – 45% in the informal network;
- Problem of economic profitability – industry sustained through hand-outs;
- Network of small informal artisanal processing units;
- Large number of individuals involved in the sale of milk produced at the farm (collection centres, hawkers, large public or privately-run farms, service cooperatives, etc.) causing problems and putting quality at risk;
- Vulnerable processing capacity – profit crisis in perspective due to the supply deficit faced with an increase in demand (12% in 2007) and direct costs;
- Rise in the demand for fresh milk to produce cheese and dairy products;
- Artisanal and dispersed distribution with a lack of control of the cold chain;
- Need for imports to satisfy the market (popular cheeses of unwavering quality at competitive prices);
- Cheese dairies suffering from poor availability of milk and competition from central dairies, more powerful in securing supplies;
- Hawkers interfering in the supply system;
- Milk quality unsuited to cheese dairies, affecting the output and quality of artisanal production;
- Quality issues concerning products from artisanal cheese dairies;
- High investment and production costs for cheese dairies;
- Specialised workforce scarce and high wage costs (competition from large cheese dairies);
- Overcapacity in industrial milk processing (central dairies) competing with the cheese-makers;
- Shortage of information and supervision despite the multitude of organisations involved;
- Lack of incentives to develop cheese dairies;
- Use of 'informal' products by competitors (flavours and caseinates);
- Random application of quality standards, financially penalising those who do apply them;
- Most family-run SMEs confronted with a market dominated by large companies (difference in industrial performance);
- Lack of knowledge about distribution circuits and their respective significance by cheese-makers;
- Lack of consumer appeal for artisanal products;
- Variable quality of artisanal products;
- Insufficient and ineffective communication about the artisanal product;

- Low propensity for consumers to pay for quality;
- Lack of familiarity with regular consumption of cheeses.

2.3. Results of the survey and analysis of the dairy chain

2.3.1. Survey sample and methodology

The survey was conducted using a questionnaire addressed to stakeholders representing the different links in the dairy chain. The questionnaire included questions about the stakeholder's business activities while others focused on their vision of the cluster. The stakeholders surveyed are mostly based in the Governorate of Bizerte, with the exception of a few located in Beja (a sheep's milk processor, a livestock farmer grouping and a collection centre).

The overall sample surveyed comprised 65 individuals, which can be grouped into 4 categories made up of 29 livestock farmers, 8 processors, 18 distributors and 10 institutional representatives.

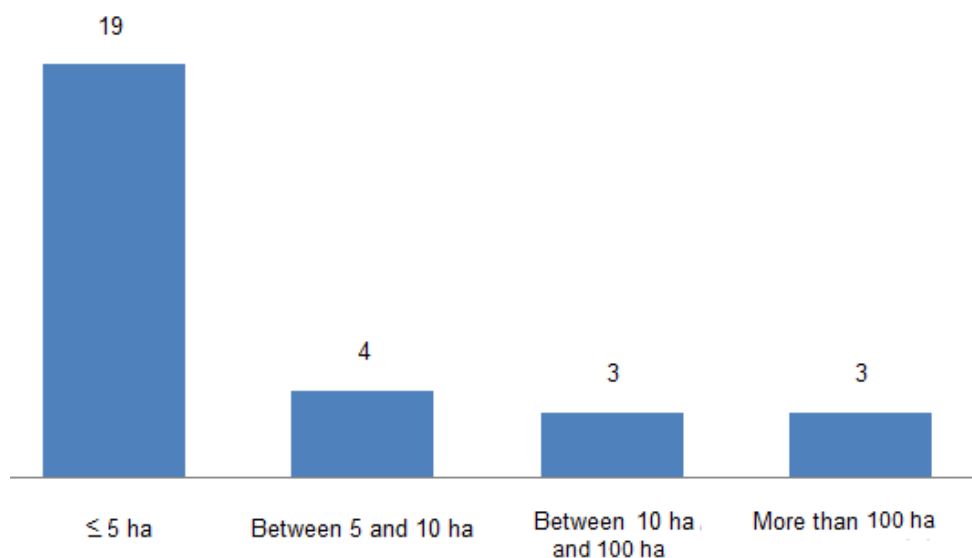
THE LIVESTOCK FARMERS

There are 11,800 livestock farmers present in the territory, 80% of them farm less than 10 ha.

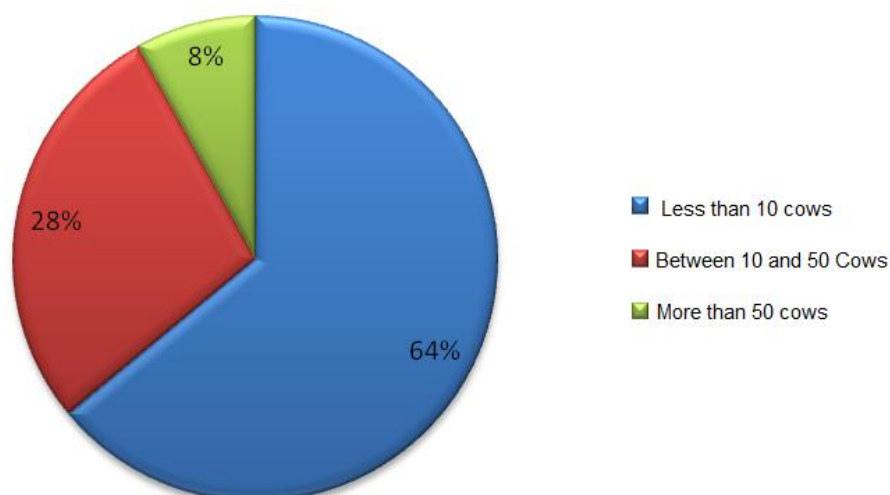
The survey sample comprised 29 farmers with heterogeneous profiles (small livestock farmers, large livestock farmers, sheep farmers, cattle farmers, sheep and cattle farmers, farmers-processors, farmers-distributors).

As the farm holding surface area breakdown of the sample indicates, 65% of farmers farm less than 5 ha either as landowners or tenants.

Graph 10: Breakdown of livestock farmers surveyed according to surface area farmed



The graph below indicates the breakdown of cattle farms surveyed according to their size. 64% have less than 10 cows and just 8% have more than 50 cows. The latter are livestock farms organised as private companies or agricultural cooperatives.

Graph 11: Breakdown of cattle farms surveyed according to size


For sheep farming, medium-sized farms dominate. Only one farm has 800 dairy sheep and three have less than 200.

At this stage of the survey, it is important to note that most of the livestock farmers were unable to provide quantified data going back to 2002. The data gathered remains very subjective approximations. In addition, annual data is only provided by the most-organised large producers. Daily data was collected for the small producers.

THE PROCESSORS

The composition of processors in the Governorate consists of 14 units. 10 are artisanal and 4 are industrial (Sotulaifrom at Mateur, Nechma at Ras Jebal, Bouchiba at Utique and Alouche at El Azib).

The survey involved 8 processing units, mostly artisanal, including one specialising in processing sheep's milk in the region of Beja. Cheese dairies in the formal sector, which account for 65% of processing, were also added.

The table below indicates the daily volumes processed, the number of permanent staff and the products offered by each processing unit surveyed. Altogether, the units process more than 6,000 litres/day and employ 29 permanent staff.

Table 17: Presentation of the sample of processors

	Average volume processed (litre/day)	Number of permanent staff	Products offered
Unit 1	400	2	Ricotta, Sicilian, "mozzarella"-type, Gouda, blue
Unit 2	400	2	Sicilian, "mozzarella"-type
Unit 3	1,000	5	Edam, Gouda
Unit 4	2,500	10	Edam, Tomme, Morbier, Gouda, Mimolette, Raclette
Unit 5	1,200	5	Sheep's cheese: ricotta, Sicilian, cooked, grated, "mozzarella"-type
Unit 6	500	3	Ricotta, Sicilian, "mozzarella"-type, Edam, Gruyere
Unit 7	450	2	Ricotta, Sicilian, "mozzarella"-type, Edam, Gouda
Unit 8	200	-	Ricotta, Sicilian, "mozzarella"-type

THE DISTRIBUTORS

The composition of dairy product distributors in the Governorate is quite broad and varied. It includes the classic distribution circuit of food products with the addition of specialised shops. The composition is dominated by small stores, which monopolise a large part of sales.

The survey sample presented in tables 18 and 19 respectively below comprised 8 distributors, including 7 hyper and supermarkets and 11 small shops.

Table 18: Presentation of the sample of distributors - hyper & supermarkets

Retailer	<i>GEMO</i>	<i>Magasin Général</i>	<i>Carrefour Express</i>	<i>Mini-markets</i>
Sales outlets	1 Géant hypermarket and 70 Monoprix stores, including 5 in the Governorate of Bizerte	46 stores in Tunisia, including 1 in Bizerte	16 stores in Tunisia, including 1 in Bizerte	n.a.
Surveyed	Géant and 1 Monoprix store	1	1	3
Dairy products offered	Milk: whole, skimmed, semi-skimmed, flavoured, light, enriched, etc. Yoghurt: natural, with fruit pulp, light, drinking, etc. Cheese: Ricotta, processed, Edam, Gouda, Gruyere, Camembert, Ricotta, dairy spread (packaged or cheese counter), imported cheese, etc. Other dairy products: butter, industrial fermented milk, liquid and thick crème fraiche, concentrated milk, etc.			

Géant was included in the sample given its proximity to Bizerte (neighbouring Governorate of Ariana), its direct access from the Bizerte-Tunis motorway and its supplies from processors in Bizerte.

Table 19: Presentation of the sample of distributors - small shops

Type	Retailer	Surveyed	Dairy products offered
Small shops	Grocery stores	8	Milk: mostly semi-skimmed Yoghurt: natural, with fruit pulp, light, drinking, etc. Cheese: processed cheese, grated cheese Other dairy products: butter, industrial fermented milk, crème fraiche, concentrated milk, etc. Artisanal cheese sold by some: Ricotta, Sicilian
	Specialised shops (creameries)	3	Milk in bulk Lben Artisanal cheese: Ricotta, Sicilian, Testouri, etc.

THE INSTITUTIONS

The survey conducted with institutions supplements the information collected by the CIHEAM-IAMM experts during their field mission in Tunisia. 10 people were surveyed and this included representatives from groupings, public institutions, collection centres, training institutes and funding bodies. The various individuals met during the field mission were interviewed as part of this survey to expand on the diagnosis of the dairy chain and their participation in the project.

Table 20: Presentation of the sample of institutional representatives

Type	Name of institution	Supervising Ministry
Grouping	Mateur dairy sheep development grouping	
	Beja dairy sheep farmers agricultural development grouping	
	Tarentaise breed farmers grouping	
Public institution	Regional Development General Commissariat of Bizerte - CGDR	Development and International Cooperation
	Bizerte Regional Office for Agricultural Development - CRDA	Agriculture
	Bizerte Agricultural Investment Promotion Agency - APIA	
Training/research institute	Mateur Higher Institute of Agriculture	
Collection centre	Bazina collection centre	
	Kassab collection centre	
Funding body	National Agricultural Bank - BNA	

2.3.2. Current state of the dairy chain

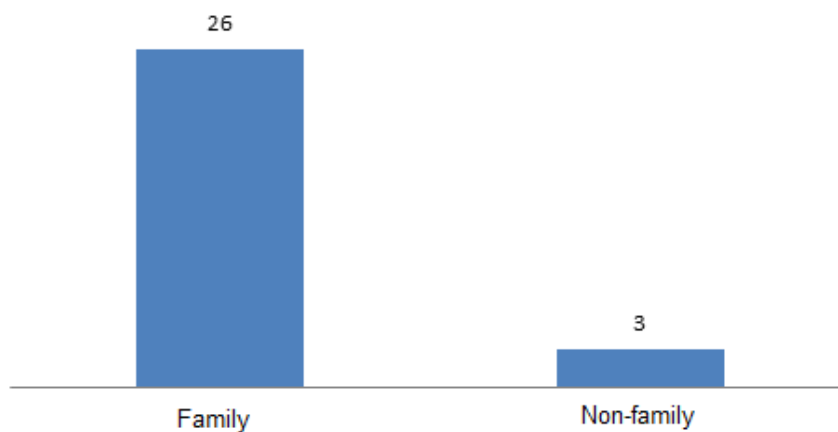
The survey made it possible to identify the nature of stakeholders present and to understand how the dairy chain operates in general. This section presents the overall results from the survey. The results concerning the strategic priorities to ensure its development are presented in section 2.2.3. and those concerning the cluster project, in section 2.3.

LIVESTOCK FARMING

The survey confirms the characteristics of livestock farming in Tunisia presented in the first part of the report and informs other aspects.

The **dominance of small family-run livestock farms** is indisputable. Broadly speaking, livestock farming is run in a family set-up, involving children, parents, spouses and cousins. 26 farms surveyed are family-run, or 90% of the livestock farmers' sample. In 7 of these, the farm manager's spouse plays a part rearing the livestock by taking care of feeding, milking and selling the milk. It should be noted that 4 livestock farmers have a different professional activity other than rearing livestock and farm work. The 3 non-family run farms are large and organised into agricultural development companies (SMVDAs), cooperative agricultural production units (UCPA) or *lot technicien*¹².

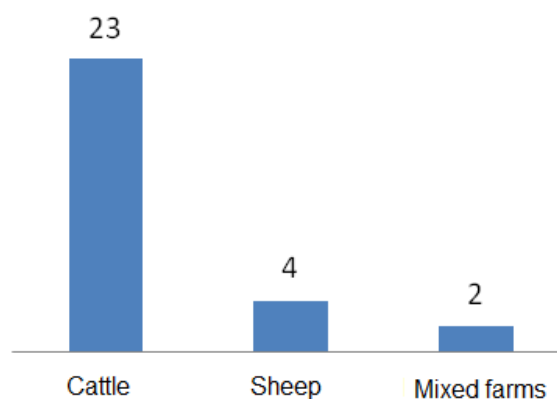
Graph 12: Breakdown of livestock farms by farm type



As previously mentioned, **65% of livestock farmers surveyed farm less than 5 ha**, which is generally split between field crops and pastureland. Farmers found it difficult to estimate the output gained from these surface areas. Given the paucity of land growing fodder to provide feed for the animals, virtually all¹³ the farmers use concentrates, which represent a significant cost, particularly for small farmers, and are paid for in cash in most cases. For a certain number of livestock farmers, feed supply is provided by their collection centres.

Cattle farms make up the majority despite there being some sheep and mixed livestock farms.

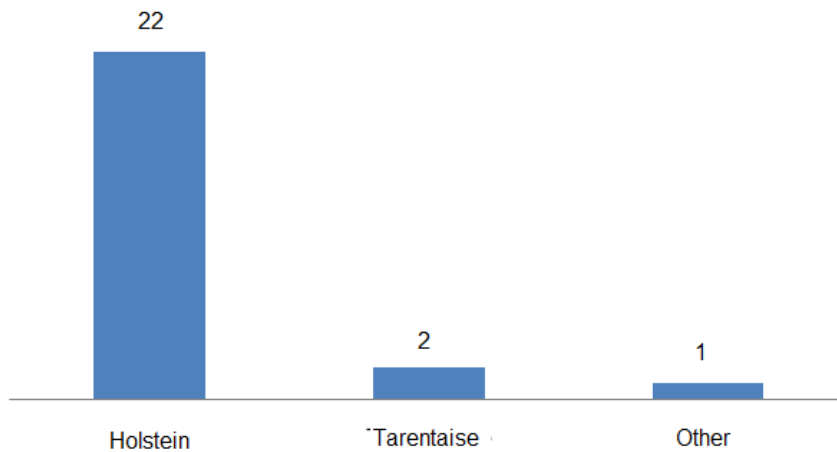
Graph 13: Breakdown of farms by livestock type



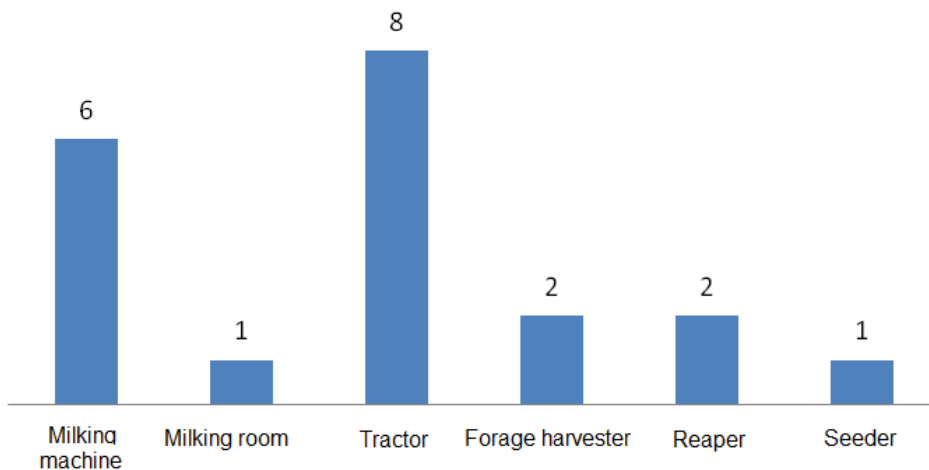
Sheep farming is limited to rearing Sicilo-Sarda dairy sheeps, which represents the core of dairy farming in Tunisia. **In relation to cattle farming, Holstein is the dominant breed.** Indeed, 80% of cattle farming concerns the Holstein breed. Other breeds such as Tarentaise and Maine-Anjou are also present, but they make up a minority share of the sample.

¹² A *lot technicien* is a plot of land leased by the State to graduates to start farming projects.

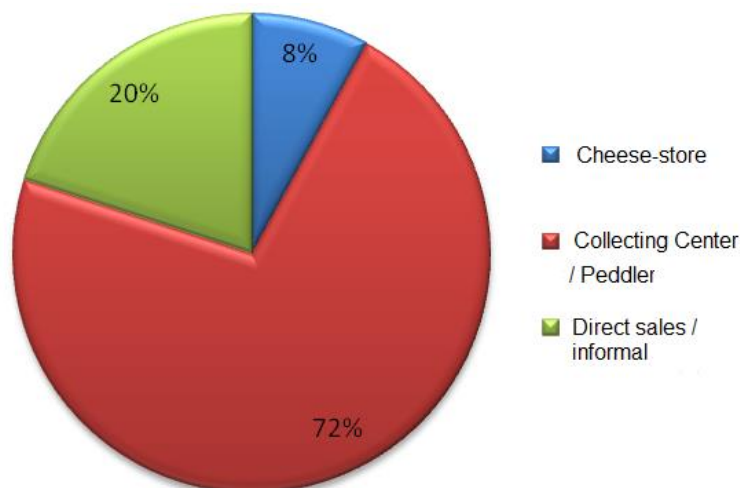
¹³ Just one livestock farmer did not use concentrates. According to his estimates, it was not profitable for him to use this type of feed and he therefore preferred to do without it.

Graph 14: Breakdown of cattle farms according to breed


Away from the large farms, **farm work and livestock rearing is based on basic means**. Just one livestock farmer possesses a fully-equipped milking parlour while 6 own milking machines and 8 use a tractor. Other machines such as silage harvesters, combine harvesters and seed drills are only found on the large farms.

Graph 15: Livestock farm equipment levels


72% of livestock farmers surveyed sell their production through collection centres. The latter represent a guaranteed sale and regular payments. Just one farmer processes his milk to make Lben and butter, which he sells from his home. For him, it is a way of adding value to his milk and to boost his income. The farmer has help from his wife to process and market the milk.

Graph 16: Sale of milk production


The milk sold to cheese dairies is generally high quality and produced on large organised farms. The sale price is higher than that of sales to collection centres (an 18% difference, on average¹⁴).

Milk is marketed within an average radius of 11 km. Small farmers deliver within a radius of 5 km. Deliveries are made by the farmer (18 farmers), customers (6 farmers), or through collection centres and hawkers (5 farmers). Deliveries are made once a day for 8 farmers and twice a day for 21 farmers. The latter have no means refrigerating or delivering the milk from 2 milkings. As concerns the choice of customers, 55% of livestock farmers highlight proximity and regularity of payment as the main selection criteria. These farmers sell their milk to collection centres while the big farmers sell their milk, after consultation, to the highest bidder. Sheep farmers expressed a lack of choice for selling their milk given the very small number of processors in the surrounding area (2, one at Mateur and the other at Beja).

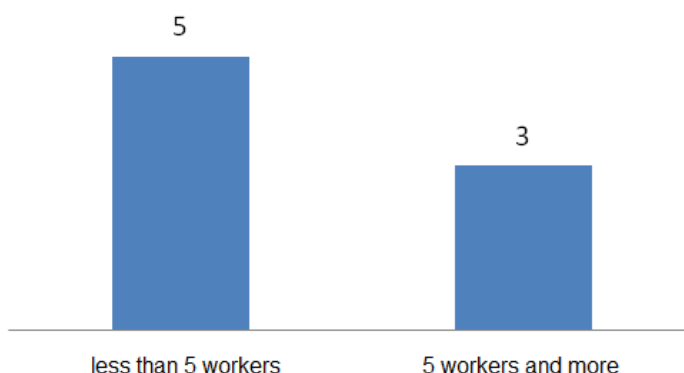
In terms of involvement in the chain, **the activity of the livestock farmers can be considered as purely individual and independent.** Indeed, just 3 of them said they had received a subsidy or state aid and 4 borrowed from the bank. Membership of farmers to professional groupings was also low.

The major problem for livestock farmers concerns production resources (animal feed, labour, water, electricity, etc.) both in terms of cost and availability.

PROCESSING

The processors surveyed had a maximum of 10 permanent staff (this is the case for just one processing unit) and 62.5% of them had less than 5.

Graph 17: Breakdown of processors according to number of employees



These units use basic facilities to carry out processing such as stainless steel tanks, stoves and moulds and just 2 processors are equipped with pasteurisation units. The respondents are, however, well-equipped in terms of storage, with 4 processors having cold rooms and 1 with a maturing cellar. All said that they had financed their investments using their own money without recourse to any other means of funding.

In terms of costs, **the purchase of milk is the main expense** for all the processors followed by that of inputs (rennet, fermenting agents, etc.) and other costs (wages, social security charges, packaging, electricity, fuel, etc.). For all respondents, the supply of milk is procured directly from the farmers within a radius of 3-30 km and through verbal agreements¹⁵. **Direct sourcing from small livestock farmers** enables better traceability of the milk and monitoring of farmers, which is not possible with hawkers or collection centres. However, some respondents admitted to buy milk from hawkers during periods of high consumption, but this milk is used for specific products other than cheese. Finally, 2 of the processors surveyed had a livestock operation; one rearing cattle and one rearing sheep.

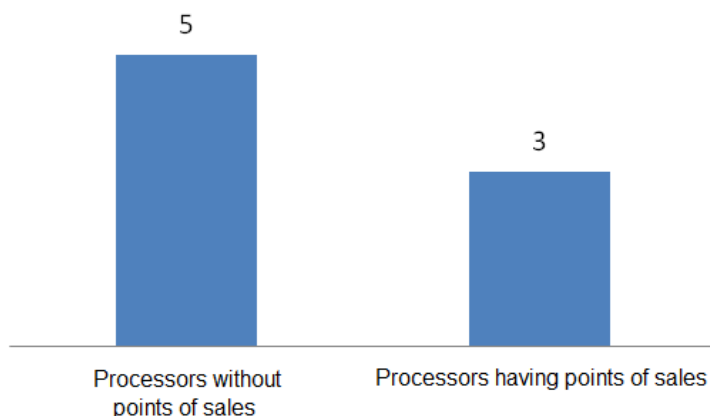
The product offer is almost identical for all processors, both in terms of product range and packaging. The latter is rudimentary and generally takes the form of a plastic bag for food use, or a pot for some products. The products offered include cheese (Rigouta, Sicilian, Testouri, Edam, Gouda, Gruyere, "mozzarella"-type cheese, etc.), milk-based drinks (Ray and Lben), traditional butter, Semen, yoghurt, etc. One processor specialises in cheeses and offers products that other respondents do not such as Morbier, Mimolette and Raclette. These products are made from cow's milk. Just one processor based in the Governorate of Beja, offers a range of products made from sheep's milk.

¹⁴ The sale price to collection centres ranges between 700 and 730 millimes whereas the price paid by cheese dairies can reach 850 millimes.

¹⁵ Just one processor has introduced a contract with its suppliers. In all cases, payment is made upon delivery of the milk.

More than half of processors have their own sales outlets to sell part of their production. If not, products are delivered to small shops, restaurants and fast food outlets, hotels and wholesalers for refined products. The production is sold exclusively on the domestic market and without any specific promotional activity.

Graph 18: Marketing of products

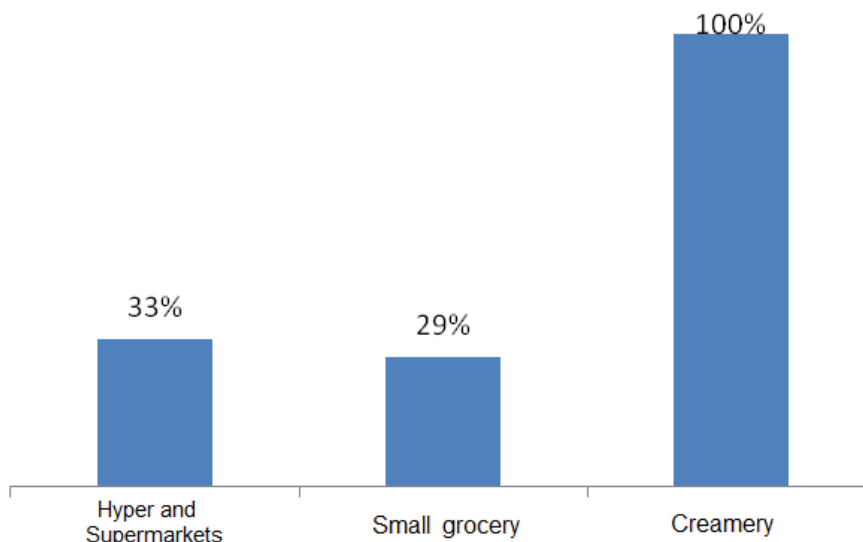


Processor relations with both customers and milk suppliers **are essentially verbal and non-contractual**. Despite its fragile nature, this situation works particularly well for customer relationships, which usually date back more than 12 years.

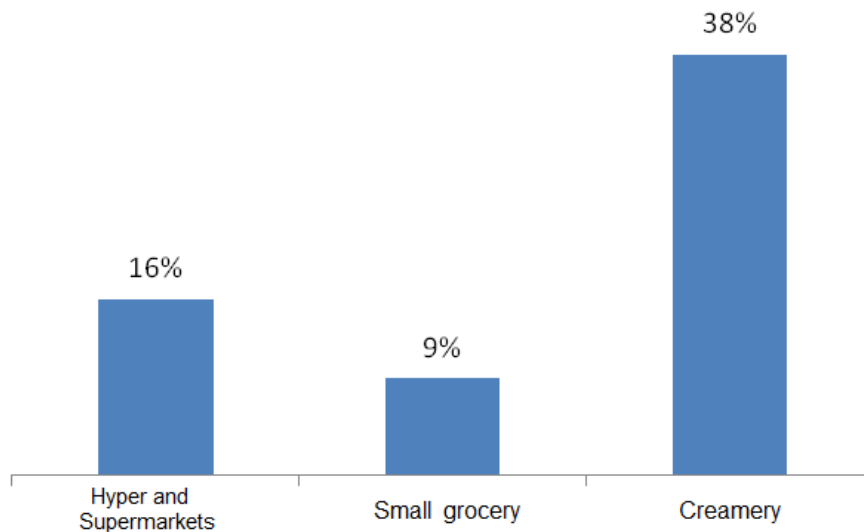
DISTRIBUTION

The proportion of sales of dairy products varies between 12% and 45%, with the exception of creameries where these sales represent the sole trading activity. Indeed, these small shops only offer dairy products throughout the year.

Graph 19: Proportion of dairy products in sales



For 83% of distributors surveyed, drinking milk remains the largest-selling dairy product. This is followed by yoghurt and cheese, which represents quite a small proportion of sales of all dairy products (see graph below). However, this proportion is much higher for hyper and supermarkets than for small shops, which can largely be explained by the former's customer profile. According to Mejri and Lajili (2007), the socio-professional category that most uses hyper and supermarkets is senior executives (30.7%). They have greater purchasing power and a westernised lifestyle, including diet.

Graph 20: Proportion of cheese in dairy product sales


2.3.3 Strategic priorities to ensure development of the dairy chain

STRENGTHS

Since the 1980's, the dairy chain has experienced considerable growth. It reached a state of self-sufficiency in drinking milk by 1999 and generated surpluses from 2000. The industry has therefore been able to meet drinking milk consumption needs and expand the dairy product offer. This outcome stems from development in every link of the chain, which is well regarded by the various stakeholders surveyed:

- Livestock farming has seen an **improvement in the genetic potential of the herd** by the import of highly productive pure breed cows. Currently, the region has a sizeable herd displaying a development potential fuelled by several conditions: huge farming potential, a region suited to dairy farming and familiarity of farmers with dairy cow farming. This strength was mentioned by 5 of the institutional representatives surveyed;
- **Good territorial coverage by the network of collection centres** and increased collection capacity providing small and medium-sized livestock farmers with a guarantee that they can sell their production and ensuring factories have a regular and sufficient supply of fresh milk. This strength was mentioned by 2 collection centre managers and a certain number of livestock farmers;
- Significant investment in production facilities has allowed an **increase in processing capacity**. The parallel development of partnerships with foreign firms has provided gains in productivity, expertise, reputation and know-how, etc. The factories have demonstrated their support for upgrading programmes by investing in expansion, renewing equipment and introducing quality management systems;
- The **presence of artisanal processing units**, offering a range of fresh milk-based products using traditional production processes and tailored marketing methods. They provide the base required to develop authentic and typical dairy products. This strength was highlighted by a number of processors seeking to expand their product ranges by introducing new cheeses to boost their competitiveness;
- **Greater involvement of processors in the production and collection links**, which has made it possible to improve product quality;
- The **development of an organised marketing channel** making it easier to supply consumers with dairy products across the country and consideration of new needs both in terms of products and consumption patterns;
- The **identification of the various links and mechanisms regulating the chain** is a significant advantage for the organisation and long-term future of the dairy chain.

CONSTRAINTS

The dairy chain experiences various constraints that can represent a barrier to its development. The constraints mentioned by stakeholders surveyed are as follows:

▪ Climatic variations

The weather in Tunisia is highly variable and seasonal (temperature and rainfall). These extreme climatic conditions constitute a risk for agriculture and livestock farming. Indeed, **periods of drought and floods often cause production losses and disruption to livestock-rearing** due to a lack of fodder and a rise in the price of cattle feed. This constraint was mentioned by a large number of livestock farmers. Ongoing climate change will increase the pressure of livestock farmers and farmers in general.

▪ Livestock-rearing and fodder

The survey of livestock farmers and institutional representatives helped identify all the constraints linked to livestock-rearing and fodder:

- **Fragmentation of land and dispersion of livestock farms:** most livestock farmers farm small areas and have little herds;
- **Failure of livestock-rearing techniques and the reproduction system:** average annual loss of dairy production can reach up to 70 days;
- **Lack of services for livestock farmers:** supervision, guidance, information, funding, training, etc.;
- **Lack of qualified labour:** one of the causes of the stagnation/deterioration in livestock farming referred to by a large proportion of livestock farmers surveyed was young people not being interested in farming, which they regard as not paying enough;
- **Fodder shortage:** the reduction in natural grazing land and the inadequate growth in fodder crops has led to a shortage of fodder and increased the use of feed concentrates made from imported raw materials. These are paid for in foreign currency and, with prices constantly rising, this reduces the profitability of livestock farms and increases the pressure on the balance of payments;
- **Seasonality of milk production:** all stakeholders in the chain, especially distributors, are affected by the shortage of milk and dairy products during low production periods and by losses during peak production periods;
- **Low levels of cattle productivity and reproduction:** the stakeholders surveyed explained this by overall livestock-rearing conditions and feed diets in operation;
- **Mediocre milk quality:** this problem is recognised by all links in the chain and is due to the negative impact of feed costs on the quality of feed rations (some livestock farmers admit to giving bread and left-overs of all sorts to their cattle). It is also due to failures in the conservation of milk (most small livestock farmers do not have chillers), the lack of organisation in the chain (which gives significant room for the informal system, beyond any control), the payment of milk “on volume” and the lack of a unified quality-based payment system (which diverts attention to quality for both production and collection).

▪ Collection

The **informal nature of relations between collection centres and producers** (lack of contracts) is viewed as a constraint to the overall organisation of the chain. In addition, the collection centres have demonstrated a **failure in their roles of supervision and support to small livestock farmers**. Finally, the collection subsidy is allocated on the basis of volume irrespective of quality, whereas the collection centres should play a **central role in improving the milk quality**.

▪ Processing

The main constraints mentioned concerning processing were as follows:

- **Need for training and information for artisanal processors;**
- **Mediocre quality of products from small informal units** due to a lack of respect for hygiene rules in the absence of checks;
- **Insufficient quality of fresh milk** (especially bacteriological) to enable greater variety in the proposed product ranges;
- **Lack of distinctive quality marks for dairy products.**

▪ **Marketing and consumption**

The marketing channel for milk and dairy products is particularly prone to problems associated with the perishable nature and conservation of products. It suffers from a **shortage of refrigerated facilities**, particularly with small traders (who account for about 80% of sales) and a **lack of control over the informal marketing channel**.

The seasonal nature of dairy product consumption counter to that of production: the period of peak consumption stretches from September to February and coincides with low production whereas the low consumption period corresponds to that of high production. Finally, **the consumption of dairy products, especially cheese, remains limited** and focuses on processed cheese and dairy spreads.

PRIORITIES PROPOSED BY THE STAKEHOLDERS

Based on these aspects, 6 priorities can be identified to develop the dairy chain:

▪ **Mastering livestock feeding**

Feeding livestock is a major preoccupation for farmers for two reasons. These are the proportion of feed costs in overall expenditure and the impact of feed on animal productivity. The cost of feed was put forward as the main problem by 70% of livestock farmers surveyed as well as by other links in the chain. Furthermore, there is a lack of technical control in feeding with small livestock farmers who fall back on concentrates to cover the shortage of fodder.

▪ **Enhancing national genetic potential**

To reduce the chain's dependence on imported heifers and lower the acquisition cost for livestock farmers (barrier to the growth of farms), it is essential to boost the rearing of pure-breed heifers born and raised in Tunisia and to develop new techniques for genetic improvements. These efforts must be backed up by adequate supervision for livestock farmers.

▪ **Improving milk quality**

While livestock farmers focus on increasing the quantities of milk produced, this preoccupation is key for all the downstream links in the chain, especially the processors. The lack of quality milk is a barrier to the development of milk processing. To address this, it is vital to encourage the installation of on-farm chilling facilities as well as supervising and training farmers to respect rules of hygiene, etc.

▪ **Building-up the processing fabric**

To address the growing demand for dairy products and the chain's development potential, an increase in processing capacity is required, especially for cheese. New businesses, particularly SMEs, setting-up in the milk production area could contribute to this.

To keep up with the changing demands of the Tunisian consumer, 2 priorities can be identified:

- Expand the product range by introducing new products that meet expectations;
- Enhance product quality by improving the quality of milk while respecting rules of hygiene and by developing know-how, etc.

The processing of sheep's milk, which has fallen sharply despite growing demand, deserves to be developed too. The same goes for goat's milk. On a regional level, goat's milk is either consumed at the farm or bought by hawkers and mixed with cow's milk to be sold on to collection centres at the same price as cow's milk. It would therefore be appropriate to make goat's milk more attractive by processing it into cheese¹⁶.

▪ **Promoting the consumption of milk products**

The consumption of milk products could be stimulated by two measures. Firstly, a tax reduction and secondly, lower margins for distributors. Indeed, milk products are subject to high taxation, which encourages the growth of the informal circuit to the detriment of the formal one. In addition, distributors have high margins, which cause stagnation, or even a drop in consumption.

¹⁶ A goat farming development project is currently being set-up at Bizerte and Beja. It aims to collect milk produced by farmers in the region and to process it into organically-certified cheese. The introduction of such a project requires monitoring and support for livestock-rearing units, animal health and veterinary assistance, a supply of locally produced animal feed, etc. The main target beneficiaries are rural women who are very much involved in livestock farming.

▪ **Organising the informal sector of the industry**

The informal sector features in the collection, processing and distribution of milk. It avoids all official controls, especially health checks. If the industry is to be organised properly, the share of the informal sector must be reduced and operators encouraged to switch over to the formal sector.

2.4. The dairy cluster project

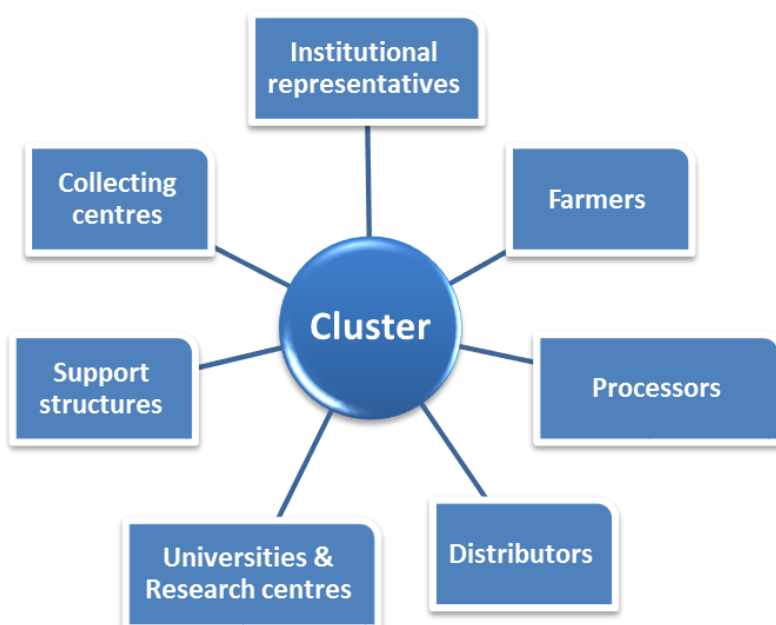
2.4.1. Objectives and priorities

To meet the needs of various stakeholder, the following objectives can be assigned to the cluster:

LINKING-UP STAKEHOLDERS

The cluster's first objective is to link up (directly or indirectly) all stakeholders involved in the dairy industry to foster the development of synergies and the emergence of practical solutions to shared problems.

Diagram 5: Networking in the dairy cluster



This objective was mentioned by 25% of people surveyed, and indirectly by all the others. Connecting people is essential in the dairy chain given the interconnected activities. Some people interviewed expressed the need to make contact with stakeholders corresponding to the same link in the chain as themselves (livestock farmer/livestock farmer, processor/processor), or with other links in the chain (livestock farmer/processor, processor/input and equipment supplier, livestock farmer/support structure, etc.). The business activities of some of them have been hindered by this lack of relations. For example, a processor needed inputs and equipment but struggled to find suppliers able to meet his requirements.

COLLECTIVE AND COLLABORATIVE ACTIONS

The cluster's second objective is to deliver collective and collaborative actions for the benefit of its members. These actions must meet their expectations and enable everyone to generate better profits. Collective actions help alter the balance of power between small businesses and bigger companies in the sector, as well as with suppliers, customers and public institutions, etc. Cooperation and reaching a critical mass helps access resources, skills, services, markets, new technology that none could benefit from individually.

Collective actions can focus on introducing services for small livestock farmers (herd health checks, supervision, good production practices, veterinary services, etc.), sharing stands at trade shows, purchasing raw materials, selling finished products, drumming-up funding, launching a common brand, setting up a monitoring system, etc.

In undertaking a collective activity, members of a cluster target a certain number of direct effects which, in turn, generate indirect effects whose nature and intensity depends on the results of the activity. For example,

launching a collaborative R&D project to reduce production times will have the direct effect of enabling each company involved to produce more quickly, reduce production costs and therefore raise their margins and revenue. Companies with more revenue can invest more and thus create new jobs. This is the indirect effect of the activity.

DEVELOPMENT OF SKILLS AND KNOW-HOW

The cluster must play a role in developing skills and know-how at all levels of the industry.

▪ **Supervision and assistance for livestock farmers**

The cluster's highest priority for the various links in the chain is to supervise livestock farmers, particularly small farmers. The cluster will therefore provide them with technical, financial and health assistance, etc. to help them increase farm yields and size, and improve the quality of milk.

▪ **Development of processing**

Processing can be boosted by:

- Protecting and promoting traditional local know-how: achieving this objective requires awareness-raising and outreach activities with small processors;
- Developing know-how: this objective is a prerequisite to introducing new products.

TRAINING, INFORMATION AND RESEARCH & DEVELOPMENT

▪ **Training**

All links in the chain expressed the need for training in different subject areas:

- Livestock farmers: herd management methods, feeding, milking, hygiene, cost control, etc.;
- Processors: making cheese, controlling quality, access to new markets, etc.;
- Distributors: cutting up cheeses, product presentation, types of cheese and uses, etc.

These training courses must be accessible in terms of cost, duration (short, given the lack of free time available to industry stakeholders), venue and content.

▪ **Information**

To guarantee the proper circulation and transparency of information between stakeholders, the cluster must incorporate a platform centralising data on all themes relevant to the industry such as diseases, treatments, manufacturing techniques, new technology, health regulations, analytical techniques, production costs, price of inputs, selling price of milk, etc.

▪ **Research and development**

The needs of livestock farmers and processors in terms of research and development are numerous. Among those mentioned most are genetic improvements, milking techniques (particularly for sheep farmers), new more rapid and accessible analytical techniques, improvements to milk quality, animal feeds and new products, etc.

2.4.2. Factors of success

To ensure its success, a cluster must combine several factors:

▪ **The human factor: a leader, members, a coordination structure**

The presence of a leader is vital to unite the cluster's different stakeholders. His business skills, as well as his mediation and group facilitation abilities represent factors that make the cluster stable and effective. In addition, relations within the cluster must be based on confidence, listening, synergy, team spirit, collaboration, mutual assistance and cooperation (as indicated by the respondents in the survey). The coordination structure must have the necessary cluster management skills to ensure that it delivers activities, exchanges both with and between the members, and achieves its objectives.

▪ **The strategic factor: a clear road map and collective strategy**

The cluster's success requires the identification of interests shared by all stakeholders as well as the definition of objectives, an action plan, the role of those involved and the resources to be used. This road map must be approved by all the stakeholders according to previously established procedures.

- **The size factor: a limited number of contributors, at least for the cluster's launch**

The cluster's originality in the region requires the support of a small number of motivated stakeholders, who are convinced of its positive benefits, to initiate the creation of such a structure. The success of initial activities will attract other members. During the survey, a number of people surveyed expressed their desire to see the cluster's initial results before joining it. This is the demonstration effect, which is a particular trait of established players who judge their incomes to be satisfactory.

2.4.3. Potential bottlenecks

Certain potential bottlenecks challenging the factors of success must be taken into consideration:

- **Individualism**

This can result from bad experiences suffered by the stakeholders and a lack of confidence in others. Some people surveyed strongly defended working alone and rejected all possibility of collaborative work whatever its form or purpose.

- **Competition**

As indicated in the Tunisian proverb, "he who has the same occupation as you is an enemy", cluster members could view other members as direct competitors to be wary of. This issue must be taken into consideration in awareness-raising activities as part of the cluster process. Stakeholders in the same value chain are not familiar with communicating with each other. This is particularly the case with the region's milk processors, who have no direct relations.

- **Weak organisation**

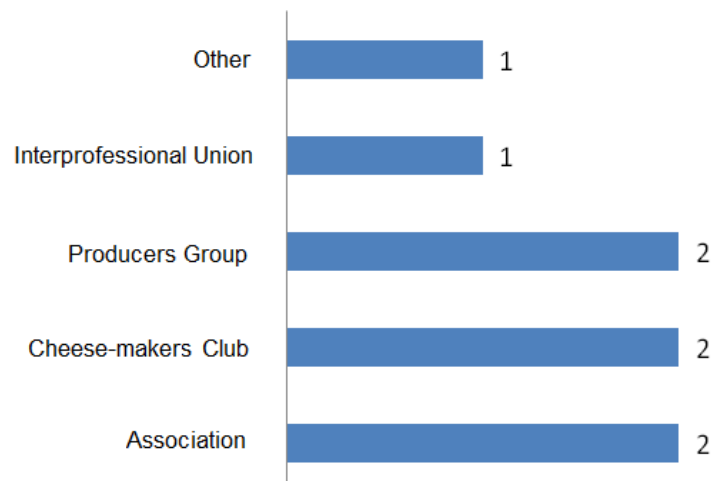
This bottleneck could be linked to the unequal distribution of responsibilities between stakeholders, disagreements over objectives, a lack of organisation or means, an unsuitable coordination structure, a lack of transparency and governance, or a poor distribution of profits, etc.

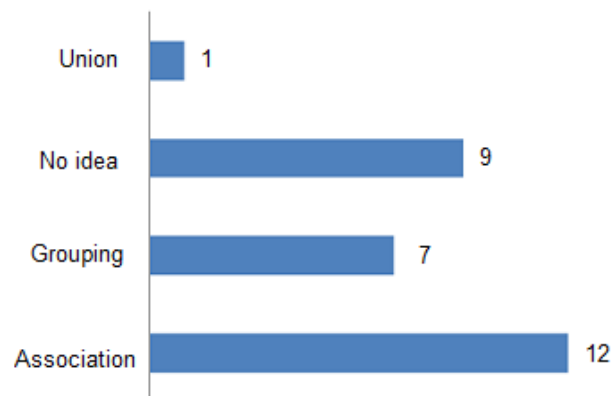
2.4.4. Governance and coordination arrangements

FORM OF ORGANISATION

The form of organisation recommended by the people surveyed is an association, followed by groupings and other forms.

Graph 21: Form of organisation recommended by processors



Graph 22: Form of organisation recommended by livestock farmers


The association appears to be the most suitable form given the rights attributed to it by Tunisian law¹⁷. These include access to information (on all subjects concerning it), meetings, publications, information, opinion on the organisation and functioning of public affairs, critical reviews and proposals.

This form limits members' responsibilities. In the case of responsibility applying to the association, its founders, employees and members cannot be prosecuted personally, legally or financially.

Financially, the association can be supported by membership subscriptions, donations, public, national or foreign donations, products obtained from the association's assets or income generated from its activities and projects. The Tunisian State has a budget to provide financial assistance and support to civil society associations depending on their projects, activities and outputs. In contrast, the association status prevents any commercial profit-making activities.

The grouping, or mutual agricultural service company, also makes a suitable form. Membership of mutual companies requires a commitment to participate in the company's capital and to use its services.

A memorandum of understanding or an agreement setting out the way the cluster operates at all levels may also be appropriate and adapted to specific characteristics that are sometimes not accounted for in other forms of organisation.

FUNDING ARRANGEMENTS

The funding arrangement preferred by the majority of stakeholders surveyed is payment for a service: each member contributes on the basis of services received. This funding arrangement can boost the confidence of members in the sense that they have direct control over the use of their financial contribution to the cluster.

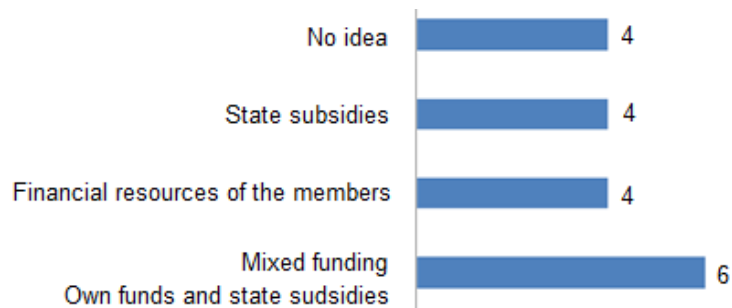
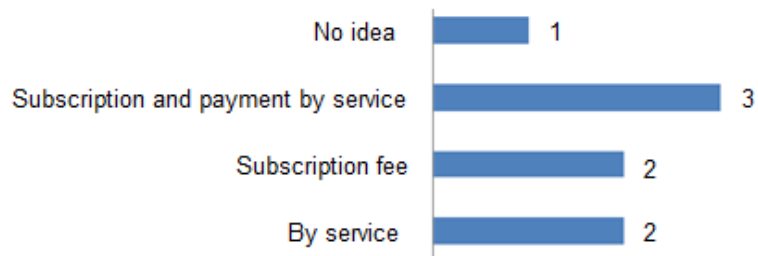
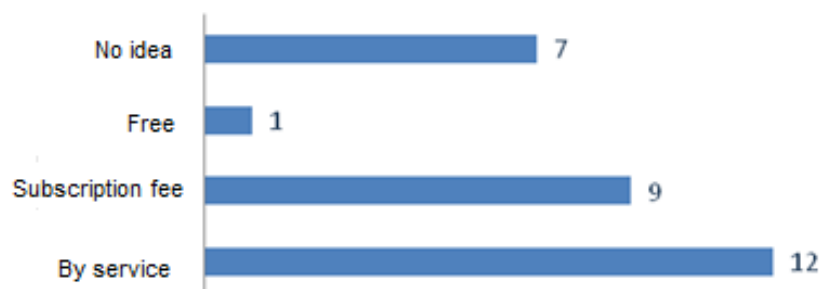
Funding by subscriptions comes second, with each member contributing through an annually set subscription fee. The total amount of the subscription fees covers all the cluster's services. The amount due can vary from one member to another according to a set of previously established variables such as number of employees, turnover, seniority in the cluster, etc. Subscription fees have two merits. Firstly, their cumulative contribution is considerable and, secondly, this contribution is more or less set and therefore predictable to help secure the cluster's funding and long-term future.

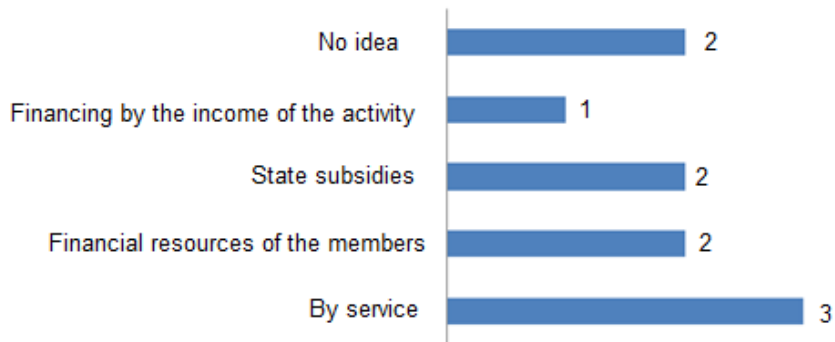
State participation comes third. The public authorities can support the cluster by funding, especially during the start-up phase when mustering private funds proves difficult. The drawback of this funding arrangement is that it restricts the cluster's activities to the amount of aid received and reduces the search of private funds by the management team.

Mixed funding is a broader, intermediate option. As such, a low subscription fee to access certain services (information bulletin, database, etc.) can be combined with invoiced services. Public-private funding is also a possibility where State grants can be added to members' own funding. The cluster can count on the initial subscription fee from its founding members, which is set when the cluster forms.

¹⁷ The procedure to create an association is regulated by Decree-Law n° 88, dated 24 September 2011.

Graph 23: Cluster funding arrangements (all stakeholders)

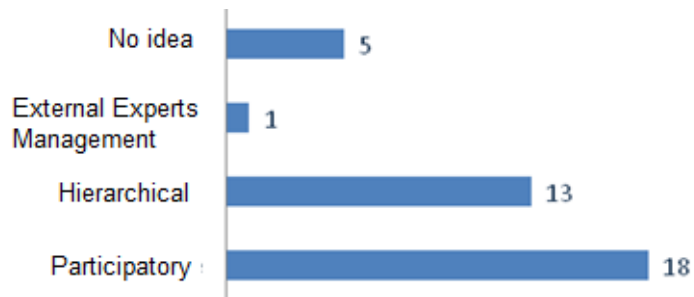
Graph 24: Cluster funding arrangements (distributors)

Graph 25: Cluster funding arrangements (processors)

Graph 26: Cluster funding arrangements (livestock farmers)


Graph 27: Cluster funding arrangements (institutional representatives)


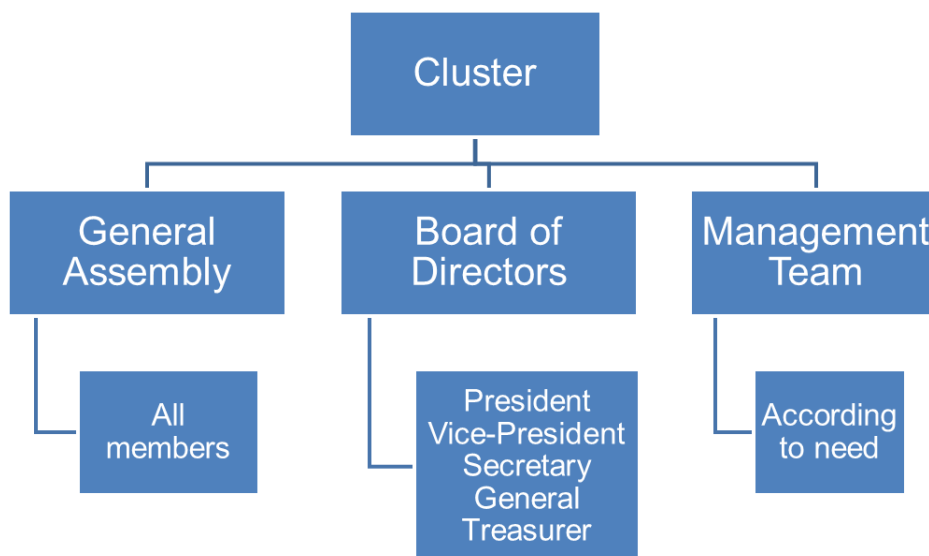
FORM OF GOVERNANCE

Opinions are divided between a participatory form and a hierarchical form. The latter is commonly justified by the lack of skills among the stakeholders and the idea that the cluster must be managed by experts and specialists in the field. Furthermore, it enables easier, quicker decision-making, thereby avoiding the onerous management process that collaborative management can create.

The participatory form is often considered to be most-suited to the cluster process, based on a collaborative and non-hierarchical approach. The participatory approach is managed by an organisation of committees and assemblies.

Graph 28: Form of governance (processors and livestock farmers)


The governance of the cluster can be structured as follows:

Diagram 6: Cluster governance


▪ **General Assembly**

The cluster's supreme authority. It brings together all its members and has the following main missions:

- define the organisation chart, the electoral mechanism and the prerogatives of each of the cluster's bodies;
- validate the cluster's strategic guidelines;
- elect the cluster's President and Board members for a period to be determined;
- define and amend the rules of procedure, decide on the procedure for dissolving, merging or splitting;
- establish decision-making methods and mechanisms to resolve conflicts;
- set the monthly or annual subscription fee;
- deliberate on the cluster's moral, technical and financial situation;
- define and amend the code of ethics.

▪ **Board of Directors**

Executive body elected by the General Assembly for a period to be determined. It can consist of a President, a Vice-President, a Secretary General, a Treasurer and as many other people as necessary for the proper functioning of the Board. Its main tasks are to:

- define strategic guidelines and objectives;
- prepare an action plan and activity programme that it submits to the General Assembly;
- ensure that the cluster operates properly both administratively and financially;
- monitor the implementation of decisions taken during General Assemblies;
- confirm the applications of those wishing to become members of the cluster.

▪ **Management Team**

Responsible for the every-day management of the cluster. It can consist of a facilitator or coordinator and a project manager or officer who manages the implementation of one or several collective actions to be undertaken by the cluster. The size of the coordination team depends on the size of the cluster and its activities. The management team's tasks are:

- to ensure the implementation of strategic guidelines defined by the General Assembly;
- to develop the cluster's relations with all its partners;
- to monitor the achievement of objectives and action plans defined;
- to supervise the management of the cluster's everyday business;
- to deliver awareness-raising and rallying activities with industry stakeholders;
- to identify and develop high value-added services for the benefit of members;
- to ensure a service offer for collective and personalised member support.

2.4.5. Potential partners

The survey helped identify motivated stakeholders capable of playing an important role in setting-up the cluster:

▪ **Hichem Chraief, Veterinary Doctor and Businessman**

Hichem Chraief runs the Utique Agricultural Services Company (UAS), which manages 5 collection centres in the region as well as other activities linked to livestock farming (imports of heifers, cattle feed, etc.).

The cluster could rely on him in its start-up phase to propose collective services and actions for livestock farmers such as chilling equipment, technical supervision, financial assistance, herd identification, sanitary health, genetic selection, embryo transfer, etc.

Collaboration between the various stakeholders in this field could have the following results:

- an increase in the size of livestock farms belonging to cluster members;
- a rise in cow productivity/yield;
- the improvement of milk quality.

- **Kamel Mabrouki, Director for agricultural credit at the Bizerte Regional Office of the National Agricultural Bank (BNA)**

Support from a financial body is vital to achieve these results, especially for farmers who have difficulties in accessing funding. Associating Mr Mabrouki with the cluster would therefore help resolve a certain number of problems.

As a next step, the cluster could undertake some work to promote the milk from those farmers having taken part in the aforementioned activities and having achieved a satisfactory level of quality. These promotional activities could be delivered in association with the region's processors or by using the cluster's own means.

- **Tarentaise breed livestock farmers grouping (GERT)**

This grouping brings together farmers rearing Tarentaise cows in the Governorates of Bizerte and Tunis who are keen to work on promoting milk from Tarentaise cows by processing it into quality artisanal-style cheeses.

- **Zied Ben Youssef, dairy sheep farmer and cheese-maker**

Zied Ben Youssef rears Sicilo-Sarda sheeps in Beja North. Since 2011, he has chaired the Beja Sicilo-Sarda sheep livestock farmers grouping (created in 2002). In 2007 he created "From Art Béja", an artisanal cheese dairy in Beja, with two family members who also had a dairy sheep farming operation and problems selling their milk. The cheese dairy makes 100% artisanal sheep's cheese products. To secure supply throughout the year, the 3 associates combined their herds in 2010 and created "Les Trois Fermes", a livestock farm split between seasoned sheeps on one side and off-season sheeps on the other. This combination enabled the 3 associates to significantly increase the volume of milk processed and sold from 120 litres per day in 2007 to 1,200 litres in 2013. The products are sold via a sales outlet in Beja and another in Tunis. With growing customer interest in their products, "Les Trois Fermes" launched "Hiking in Trois Fermes" in 2012. This allows participants to discover the dairy sheep farms and local products from Beja North, especially artisanal cheeses.

A collaborative venture is planned between the dairy sheep grouping and the Tarentaise cow grouping to make products from different kinds of milk (sheep and cow's milk).

- **Abdelkrim Bessadok, Director of the agricultural development company "Chergui"**

Abdelkrim Bessadok manages an agricultural development company (SMVDA) with a cattle farming operation of 450 cows. The milk produced by this farm is good quality and currently sold to a cheese-maker. Abdelkrim Bessadok plans to process his milk on-farm to offer a new product. He is thinking, in particular, about a Gorgonzola-type cheese; a traditional blue-veined cheese made from cow's milk, which is produced in the regions of Lombardy and Piedmont.

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Appendixes

Appendix 1: Public institutions and professional organisations

Public stakeholders

▪ The Ministry of Agriculture and Hydraulic Resources

The structure of the central administration was initially defined by Decree n° 87-780 of 21 May 1987, concerning the organisation of the Ministry of Agricultural and Food Production. This decree established the Directorate General of Animal Production (DGPA), comprising 3 directorates (animal health, animal husbandry and public veterinary hygiene).

Next, Decree n° 2001-419 of 13 February 2001, established the powers and duties of the Ministry of Agriculture and Hydraulic Resources whose mission is to “implement State policy in the agriculture and fisheries sector in coordination with the relevant Ministries, to monitor the promotion of the sector and to foster the creation of a favourable environment for its development”.

The Directorate General for Production therefore incorporated 2 departments: Animal Production and Food.

The Directorate General for Veterinary Services (DGSV) was also established. Its missions in relation to the dairy chain include: sanitary control of vehicles used to transport food products of animal origin and their derivatives, health and quality checks of food products of animal origin at the stages of production, processing, storage, distribution and usage. In partnership with the appropriate services of the Ministry of Public Health, it also takes part in monitoring the production of medicines and biological veterinary products, checks on their quality and the issue of marketing authorisations.

▪ Regional Offices of Agricultural Development (CRDA)

The regional organisation of the Ministry of Agriculture is governed by Decree n°89-457 of 24 March 1989, which delegates the Ministry’s powers for agricultural production to the Governors. As such, a CRDA was set up in each Governorate as an administrative public establishment with legal status and financial autonomy. It is managed by a Commissioner appointed by decree based on a proposal made by the Ministry of Agriculture.

The CRDA is responsible for implementing State agricultural policy in the Governorate. It undertakes regional development activities and carries out all specific tasks that are entrusted to it by the current legislation and regulations.

Pursuant to Decree n° 89-832 of 29 June 1989 on the organisation and functioning of the CRDA, each CRDA consists of divisions and districts, whose number and powers are determined by specific organisation decrees.

The Order of 16 November 1981, supplemented by the Order of 30 March 1984, determines the number and powers of technical districts operating under the authority of the CRDA. Animal husbandry, fodder crops, cattle feed and genetic improvement have been taken away from the new organisation of the Ministry of Agriculture and the powers of the animal production district and transferred to the regional headquarters of the Office of Livestock and Pasture (OEP).

Each animal production district is divided into a specific number of areas corresponding to the way the Governorate is split up into delegations. It is headed-up by an area manager who combines various tasks set out by the Ministerial Order of 16 November 1981. The area managers are placed under the administrative authority of the Territorial Extension Unit (CTV) Director. On average, they devote 80% of their time to mandatory disease prevention campaigns, a large part of which is carried out by technicians reporting to them.

▪ The State Lands Office (OTD)

Established in 1961, OTD is a public company that manages an area of 153,000 ha split into 27 Agri-Conglomerates and Agro-Industrial Units. Its main tasks centre on the following priorities: managing the state land at its disposal, diversifying agricultural production and introducing new farming techniques, participating in national efforts to promote agricultural exports, particularly olive oil, vegetables, wine and citrus fruits.

The Utilised Agricultural Area (UAA) is 87,000 ha (or 56% of the total agricultural area), including 62,000 ha of olive groves with the remainder (27,000 ha) consisting of tree fruit production, arable crops and market gardening. The area of irrigated land is estimated to be 8,500 ha.

OTD's livestock sector mainly consists of an average headcount of around 12,000 cows, 58,000 sheep, 500,000 laying hens and 1.3 mln broiler hens. Milk production reaches 30 mln litres and comes from its cattle (Holstein breed) and sheep herds, mostly concentrated in the North and Centre Agri-Conglomerates. The Agri-Conglomerates of Ghezala (Governorate of Mateur) and Alem (Governorate of Kairouan) have the highest numbers of cattle and provide almost 34% of OTD's total milk output. Dairy sheep milk production is exclusively provided by the Agri-Conglomerate of Ghezala, which has 939 heads, producing a volume of 55,000 litres. Milk production in the Agri-Conglomerates of Mohsen Limem and Alem is destined for cheese production (OTD's two cheese dairies are located nearby).

▪ **The Office of Livestock and Pasture (OEP)**

Created in 1966, OEP is a non-administrative public company (EPNA) reporting to the Ministry of Agriculture. It is responsible for the development and promotion of the livestock and pastures sector and acts as an advisor and technical expert for the public authorities.

Its 4 main tasks are to develop fodder and pasture resources, to promote livestock farming techniques, to monitor the sector and contribute to its economic development as well as to accomplish all the specific tasks that the State delegates to it.

The feed resources programme is run by providing services in the form of cash and in-kind incentives to beneficiaries to install and upgrade facilities. These incentives vary according to the type of facility, activity and vocation of the land.

The livestock development programme consists of different parts:

- animal identification: identification of each animal using a unique individual number recorded in the national database;
- performance checks: improving livestock productivity, genetic assessments for selection purposes (milk yield checks, growth checks, milk and fodder sample analysis);
- animal breeding: improving the genetic potential of livestock animals by a better choice of breeding animals used in the production of semen or in natural mating;
- the herd book: creation of a database, edition of pedigree and use of the data (selection, morphology, well-researched mating, etc.).

There are 5 programmes supporting the dairy chain. These include national milk collection, the development of pure-breed heifers born and reared in Tunisia, the dairy sheep sector, supervision of dairy cow farmers, and the mass supervision programme.

▪ **The Agriculture Investment Promotion Agency (APIA)**

APIA is a non-administrative public establishment reporting to the Ministry of Agriculture. Its mission consists of encouraging, promoting and assisting investments in agriculture, fisheries and associated services as well as in first-level processing connected to farming and fisheries projects.

APIA provides the following services:

- granting of financial and tax benefits to agricultural, fisheries and first-level processing project promoters;
- identification of investment opportunities and project ideas to promote to Tunisian and foreign private operators;
- assistance to promoters on how to prepare their investment application and implement their projects;
- training of young agricultural developers and support for identifying, designing and implementing their projects;
- networking between Tunisian and foreign project developers with a view to promoting partnerships and trade;
- organisation of events, seminars, information days and partnership meetings;
- participation in specialised trade fairs and shows in Tunisia and abroad;
- joint coordination (with inter-professional groupings) of the quality network established in the different agricultural sectors.

APIA has:

- an Investor Liaison Office (a one-stop shop) in Tunis;

- a Regional Directorate in each Governorate;
- Benefits Committees both centrally and regionally;
- business incubators in most of the higher education institutes for agricultural training.

▪ **The Agricultural Extension and Training Agency (AVFA)**

AVFA¹⁸ is an administrative public establishment placed under the authority of the Ministry of Agriculture. It monitors the implementation of programmes pertaining to social and economic development plans, essentially in terms of training and extension.

In terms of training, AVFA is responsible for developing and monitoring initial and lifelong training programmes as well as implementing and monitoring upgrade programmes in training establishments so as to meet the needs of the profession and labour market demands.

In terms of extension, AVFA provides support to field-based extension programmes developed by CRDAs to improve the level of skills and know-how of extension workers. It organises workshops on programming, monitoring and reporting systems as well as pilot national information days.

On an operational level, Regional Extension Units (CTV) are located throughout the country. Each CTV supervises 4 to 10 agricultural extension centres (CRA), each with one extension worker.

Support services

▪ **The National Center for Animal Health Surveillance (CNVZ)**

CNVZ is an administrative public establishment (EPA) for scientific and technical support and reports to the Ministry of Agriculture. Its mission consists of providing reliable scientific information to national veterinary services enabling them to determine priorities and develop strategic plans for animal health.

CNVZ has 6 regional observation units throughout the country. Their scientific and technical staff consists of 10 veterinaries, including one interim vet (staff at beginning of 2010).

A 2-year institutional twinning project (Jan 2012 - Jan 2014) has been developed by France in consortium with Italy and in association with Spain. It will enable CNVZ to develop a monitoring procedure for livestock diseases to deal with the emergence of new epidemics in the region, especially in Libya.

▪ **The Tunisian Veterinary Research Institute (IRVT)**

IRTV is also an administrative public establishment (EPA) for scientific and technical support and reports to the Ministry of Agriculture. It is responsible for operations, research and experimental work in the field of veterinary sciences. Its main tasks are:

- to organise, undertake and publish all analytical and research work focusing on animal health and zoonosis, foodstuffs of animal origin (preparation, distribution, import/export);
- to participate in all analytical and research work focusing on livestock rearing techniques, genetic improvements and animal feed;
- to contribute to extension work and demonstration activities by providing knowledge and techniques likely to be popularised;
- to participate in student training and to make a joint contribution with the National School of Veterinary Medicine to strengthening the capacity of executives specialising in veterinary science.

IRVT's regional laboratories provide logistical and scientific support to epidemiology surveillance networks and take part in the design of protocols, the collection and processing of data, and the interpretation of results. They also play an important role in disseminating information.

▪ **The National Gene Bank (BNG)**

Launched in November 2007 under the authority of the Ministry of the Environment and Sustainable Development, BNG's main mission is to preserve and assess plant, animal and micro-organism genetic resources, to coordinate the various operators and to promote the use of sustainable genetic resources. It works with all establishments and operators in the sector as part of a national network formed from 9 thematic groups.

¹⁸ Law N°99- 31 of 5 April 1999, amending the Law 90-73 of 30 July 1990 regarding the creation of the Agricultural and Training Extension Agency.
Decree N°99-2825 of 21 December 1999, amending Decree n° 87 779 of 21 May 1987 regarding the organisation of the Ministry of Agriculture

In 3 years, BNG has managed to collect and preserve more than 35,000 local genetic accessions. During 2010, it undertook actions of collection, repatriation and conservation of genetic resources from sheep and cattle. It also worked on the genetic management of Sicilo-Sarda and Black Thibar sheep breeding stock.

As concerns cows, the indigenous breed has been subjected to all kinds of cross-breeding with exotic breeds (Friesian, Brown Atlas, and Tarentaise). The pure indigenous ecotypes are difficult to identify. BNG is working to make an inventory to phenotypically and genetically characterise animals approximating to the breed standard. A study on genetic diversity conducted in 2010 used 147 DNA samples (13 Blonde du Cap Bon and 134 Brown Atlas).

▪ **The National Centre of Agricultural Studies (CNEA)**

Created in 1974, CNEA is a public establishment placed under the authority of the Ministry of Agriculture, with legal status and financial autonomy, giving it the attributes of a national and international private engineering consultancy.

Its missions consist of:

- undertaking technical and economic studies concerning agricultural development projects for administrations, public companies and private developers;
- organising and conducting the training of officials in the fields of project analysis and assessment as well as building the capacity of Tunisian and foreign interns.

CNEA offers services ranging from feasibility studies to the financial set-up of agricultural projects. It also provides technical analysis to define rural development strategies and to support decision-making on a macro-economic scale as well as at company-level.

▪ **The Agri-Food Technical Centre (CTAA)**

Created by a Ministry of Industry Order of 29 February 1996 (in accordance with Law n° 94-123 of 28 November 1994 regarding industrial technical centres), CTAA is a technical body for those working in the agri-food industry. As a public legal entity of economic Interest (PMIEP) with legal status and financial autonomy, it contributes to the development and promotion of food industries by providing technical assistance to the different branches in this sector.

CTAA provides services of analysis, studies, assistance and training. It also manages and takes part in various programmes to improve agri-food company performance.

▪ **The Bizerte Competitiveness Pole (PCB)**

PCB is part of the national strategy to promote the agri-food sector in the XI Development Plan. It consists of 3 components: an agri-food technology park, industrial areas and an AGRO'TECH partners' network.

The Bizerte agri-food technology park covers 45 ha located in Menzel Abderrahman. It plays the role of facilitator and coordinator for the Tunisian agri-food sector and complements the efforts of existing bodies and institutions. In accordance with the national programme for technology parks in Tunisia, the Bizerte agri-food technology park is globally-oriented. It is based on 3 pillars: research, training and production. Interaction between these 3 pillars fosters the creation of synergies and promotes innovation and growth in competitiveness.

The industrial areas cover a total area of 150 ha and will house Tunisian and foreign companies operating in various business sectors.

The AGRO'TECH network comprises regional, national and international partners and provides all operators with the necessary information and expertise. It is a locus for exchange and partnerships between the various stakeholders in the agri-food sector. By the end of 2013, it had 31 partners (23 Tunisian and 8 foreign) as well as a 'hard core' of 102 industrial companies.

Local and foreign companies wishing to settle in the technology park and industrial areas benefit from the services offered by PCB. These services are either provided directly through the agri-food technology park, or in partnership with the AGRO'TECH network. They include support for setting-up and/or expanding a business as well as supervision for young business developers.

▪ **The National Agricultural Bank (BNA)**

As a limited-liability company created in 1959, BNA is both a universal bank and a bank for funding agriculture. True to its vocation, it supports the agricultural sector with all its components and stakeholders, in line with national guidelines. While expanding its activities, BNA has always attached great importance to funding agricultural projects in its medium and long-term action plans and strategies.

The BNA's 16 regional offices based in the Governorates' capitals are also tasked with providing supervision and support to branches and agencies in their area of jurisdiction, managing commercial and industrial loans and managing agricultural loans, etc. BNA also has 165 agencies throughout Tunisia.

Professional organisations

▪ The Interprofessional Group of Red Meat and Milk (GIVLait)

Created in 1994, GIVLait¹⁹ is an interprofessional organisation of public economic interest with legal status and financial autonomy, placed under the authority of the Ministry of Agriculture. It is managed by a Board of Directors made up of 12 members representing the Tunisian Union of Agriculture and Fisheries (UTAP, 4 members), the Tunisian Union of Industry, Commerce and Crafts (UTICA, 4 members), the Ministries of Agriculture, Industry, Energy and Small and Medium Enterprises, Commerce and Crafts, and Finance.

Its main tasks are to organise the red meat and milk sectors and foster relations between the professions, to promote quality and to regulate the market.

▪ The Tunisian Union of Agriculture and Fisheries (UTAP)

UTAP is a national organisation representing Tunisian farmers and fishermen within regional multi-disciplinary federations and specialised national federations. It acts as a union, defending the interests of farmers and fishermen. It also promotes the profession and plays the role of preferred contact with the administration. UTAP also has a supervision and guidance facility, which is directly involved on the ground with farmers.

Centrally, the organisation comprises a multi-disciplinary unit (created in 1994) and 3 specialised units (created from 2005 onwards) dedicated to fisheries, women farmers, and livestock farming. 5 regional units have been created since 2005 in Jendouba, Le Kef, Kairouan, Gabes and Medenine.

▪ The Tunisian Farmers Syndicate (Synagri)

Synagri was created in December 2011 in response to the crisis experienced by UTAP following the Tunisian revolution. Its founding committee was appointed during its first congress held on 26-27 January 2012. The new farming organisation calls for greater independence of all professional agricultural organisations (groupings, cooperatives and technical centres) by accelerating the revision of laws governing their activities and the introduction of a financial policy addressing the agricultural sector's specific characteristics. Synagri wants to launch a national dialogue, which may lead to a shared diagnosis of the agricultural sector and to the identification of solutions for an integrated and sustainable agricultural policy.

▪ The Tunisian Union of Industry, Commerce and Crafts (UTICA)

UTICA is the employers' organisation representing Tunisian business leaders in the industrial, commercial and craft sectors. It is arranged into 24 regional unions of industry, commerce and crafts located in each Governorate. These regional unions are, themselves, composed of regional trade unions and local unions.

It is also organised into 17 sector federations, including an agri-food federation which comprises several trade unions involved in most of the branches of the industry. The agri-food federation has offices in all the Governorates and delegations of Tunisia.

UTICA's main missions are to defend the interests of its members, to contribute to economic development in the country in coordination with public authorities and other social partners, and to promote the industrial, commercial and craft sectors through technical services, training and support.

¹⁹ The texts governing the operation of agricultural and agri-food interprofessional groupings are:

- Law n° 93-84 of 26/7/1993, which defines these structures as being independent entities of public economic interest with a legal status and financial autonomy;
- Decree n°94-1165 of 23 May 1994 regarding the approval of model statutes for interprofessional groupings in the agricultural and agri-food sector.

Appendix 2: Specifications for typical dairy products of Bizerte and Beja

General terms and conditions

FRAMEWORK FOR DRAFTING SPECIFICATIONS

The present specifications were requested by PCB as part of the LACTIMED project and have been produced by Mrs Sihem Bellagha and Mr Abdellatif B'Chir, in collaboration with PCB. The purpose of this was to formalise methods to obtain typical dairy products of the Governorates of Bizerte and Beja. It defines the requirements to be met when producing 5 typical products of Bizerte made from cow's milk (Leben, Zebda, Smen, Testouri and cow's milk Rigouta) and 5 typical products of Beja made from sheep's milk (Sicilian cheese, Rigouta, Tayeb, sheep's milk yoghurt and "Les Trois Fermes" matured cheese).

STATUTORY TEXTS

To make these products, dairy processors must respect provisions made in the present specifications as well as general rules of hygiene and good practice. They must also comply with current relevant regulations and particularly, the provisions of:

- Law 92-117 of 17 December 1992 on consumer protection;
- Law 2005-95 of 18 October 2005 on livestock and animal products;
- Decree N° 66-139 of 2 April 1966 on the repression of fraud in the sale and manufacture of margarine, oleomargarine and Smen;
- Order of 22 July 1985 on the approval of Tunisian standards concerning the display and labelling of pre-packaged foodstuffs;
- Order of 29 October 1991 on the approval of Tunisian standards concerning analytical methods for milk and dairy products;
- Order of 29 October 1991 on the approval of Tunisian standards concerning specifications of dairy products;
- Order of 22 July 1994 on the approval of Tunisian standards concerning the analysis of dairy products;
- Order of 26 May 2006 determining methods of veterinary health checks, conditions and procedures for granting health and safety certificates for production, processing and storage facilities for animal products;
- Order of 23 August 2006 on the approval of Tunisian standards concerning raw milk destined for processing and fermented milk;
- Order of 3 September 2008 on the labelling and display of pre-packaged foodstuffs;
- Order of 5 January 2009 approving specifications determining the conditions of transport for fresh milk;
- Order of 16 April 2013 on the cancellation of the mandatory character of Tunisian standards in agri-food industries.

COMPLIANCE MONITORING

The units producing typical dairy products of Bizerte and Beja must meet the requirements of the present specifications as soon as approval has been granted by the appropriate authorities. Furthermore, these units are requested to introduce an internal control system enabling them to ensure that rules of hygiene and good practice are respected throughout the process of production and sale of the products. Any eventual deficiencies together with corrective actions taken to resolve them and their effectiveness will be listed in a register specially designed for this purpose.

The unit must develop a coding system for its sources of supply and sales outlets so as to ensure efficient traceability. It will also hold a register in which all information concerning collection, transport, storage of milk as well as its sale will be recorded. This register will include, in particular:

- the identification of the livestock farmer, or collection centre (the latter is obliged to provide identification of the origin of its supply) having provided the cow's or sheep's milk;
- the quantities supplied as well as the date and time of delivery;
- the inspection characteristics concerning the milk delivered;
- the date and time of production of the cheese (start and end of process);
- the storage duration of the product in the production unit;
- the date and time of delivery of the final product to the sales outlets;

- each batch must display a sign enabling traceability to be guaranteed.
- This register will be presented to the organisations tasked with applying the present specifications.

Typical cow's milk products of Bizerte

OPERATORS IN THE CHAIN

The operators concerned by the present specifications are mostly cattle farmers from the regions mentioned in the section below, collection centres, transporters and dairy processing units. Each unit must identify its livestock farmers, collection centres and/or milk transporters.

The livestock farmers must be sure to carry out annual veterinary inspections on the herd in order to check for tuberculosis and brucellosis and proceed with vaccinations. In addition, mastitis (which is responsible for dwindling production and alters the composition of milk making it improper for processing) is eradicated from the farms. Farmers will regularly clean their cow sheds and disinfect them.

Aside from the general rules of hygiene in handling milk as well as the statutory texts above, processing units are required to observe the following conditions:

- milk must be refrigerated immediately after milking;
- delivery to the factory must be done with refrigerated vehicles;
- milk received must be kept at a temperature of 4°C;
- milk cannot be stored in these conditions for more than 24 hours.

These units will ensure, on their own account, that transport conditions comply with rules of hygiene. Where required, the mandated transporters must comply with current transport regulations for dairy products.

PRODUCTION AREAS AND PASTURELAND

The areas concerned by the present specifications cover the whole of the Governorate of Bizerte. Animal feed in these areas mainly consists of oats, bersim clover, barley grass and alfalfa. The feed is mostly supplemented by rations of straw and hay as well as sorghum, concentrates and small quantities of bran.

MILK CHARACTERISTICS AT THE MILKING STAGE

In addition to compliance with appropriate Tunisian standards, the milk used for making the products featuring in the present specifications is characterised by:

Density	1027.63 – 1028.35	-
Fat	32.25 – 34.06	g/l
Proteins	32.43 – 32.26	g/l
Dry matter	10.6-11.64	%
Ash	6.22 -6.93	g/l
Lactose	50.35 – 51.05	g/l
pH	6.66 – 6.74	-
Acidity	14.14 -14.53	°D
Freezing point	-0.4949 - -0.5053	°C

Source: INAT survey (Spring 2012). Group of students. Supervisor: Mrs H. GLIGUEM.

SPECIFICATION 1 – TRADITIONAL LEBEN

- i** The present document defines the requirements to be met when processing cow's milk into "traditional Leben" as well as the conditions for its conservation and sale on the market.

- **The product**



Appearance: refreshing drink

Description: fermented milk

Designation: traditional Leben of Bizerte

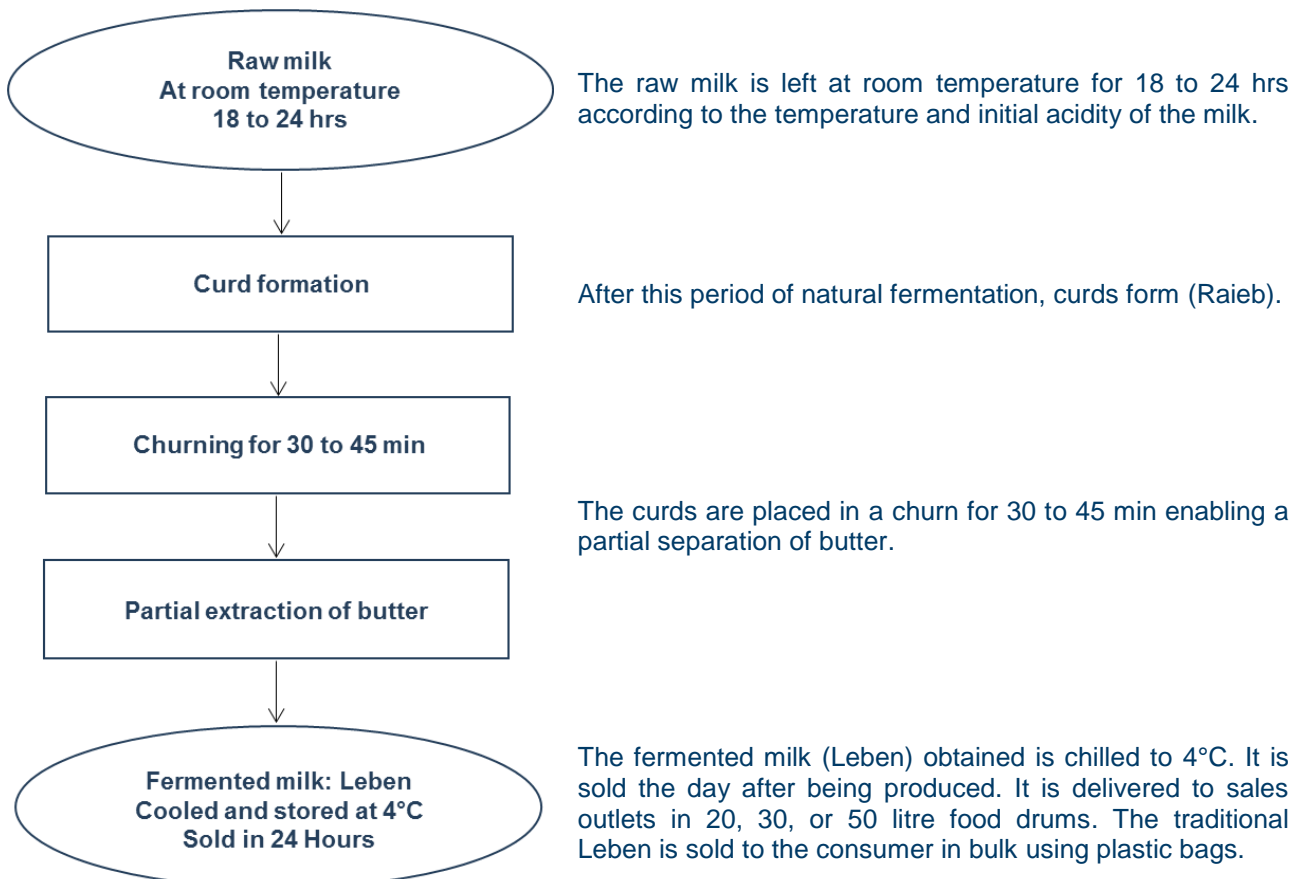
Sale: in bulk, in bags

Not to be confused with Labne, which is produced in the Middle East, this typical Tunisian beverage is consumed cold to accompany traditional Tunisian dishes such as couscous.

The north of the country, particularly the Governorates of Beja and Bizerte, which produce various cheeses and other local dairy specialities, also has an artisanal production unit for Leben.

The traditional production technique for Leben has been passed down through the generations and taken from that adapted by shepherds to satisfy their needs for a refreshing drink. Back then, churning was done at using a goat skin specially designed for the purpose.

- **Production method**



- i** The Leben sold can also contain bits of butter floating on the surface. The use-by-date (UBD) of Leben is 2 days.

SPECIFICATION 2 – ZEBDA ARBI

- i** The present document defines the requirements that must be met when processing cow's milk into "Zebda Arbi" as well as the conditions for its conservation and sale on the market.

▪ The product



Appearance: mound of butter

Description: traditional butter made from cow's milk

Designation: Zebda Arbi de Bizerte

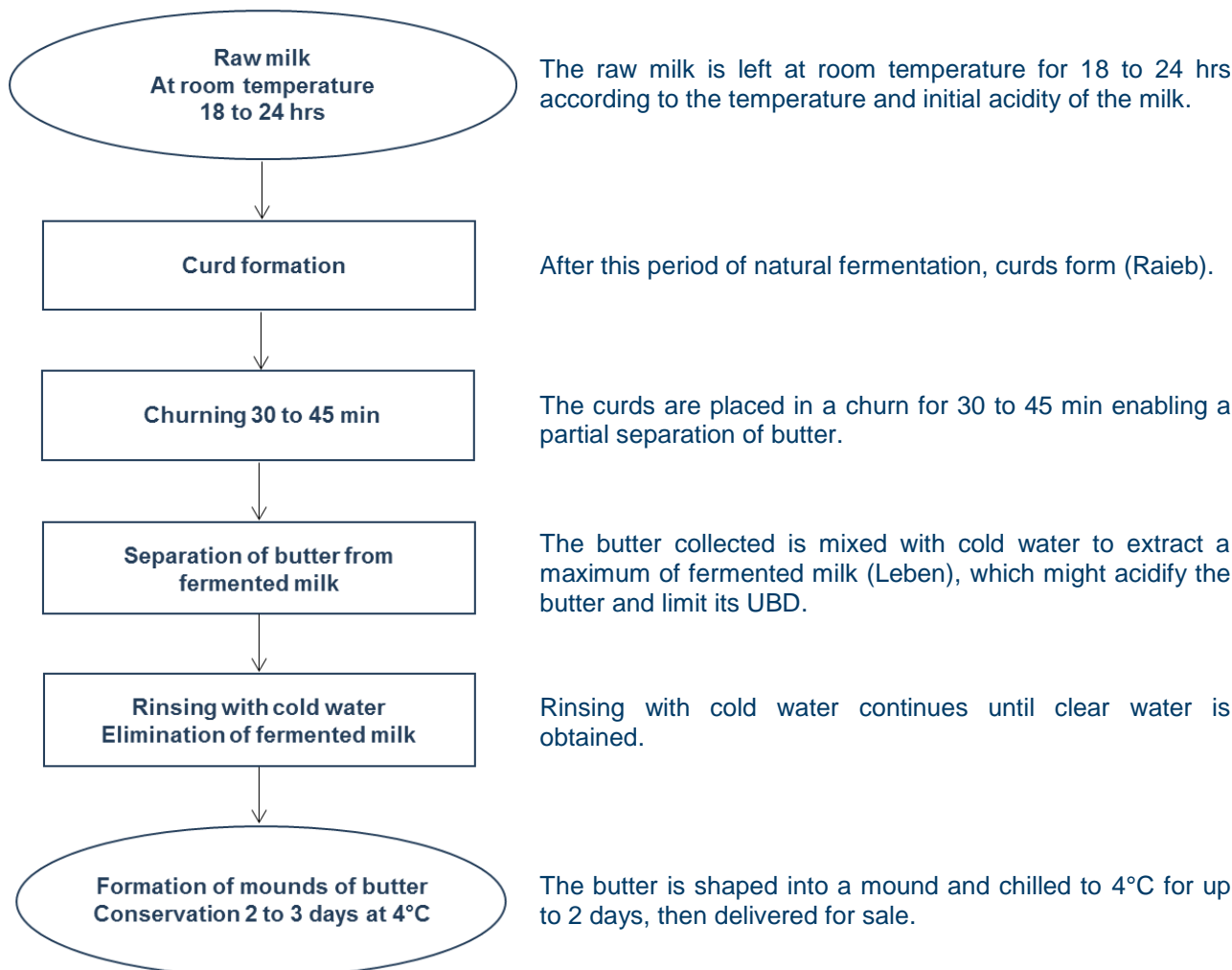
Sale: in bulk

Producing Leben results in the production of a kind of butter known by the name of Zebda Arbi. After extraction from the Leben, this butter is obtained and produced in an artisanal way.

Zebda Arbi is used in various food preparations, but can also be consumed on toast, like all industrial butter.

As with Leben, it is produced using a traditional technique passed down through the generations. Processing milk into Zebda Arbi has been reproduced from the technique adapted by shepherds to produce butter.

▪ Production method



- i** Zebda Arbi is delivered in mounds to sales outlets, kept at 4°C and sold in slices to consumers. The UBD is 5 days.

SPECIFICATION 3 – SMEN

i The present document defines the requirements to be met when processing cow's milk into "Smen" as well as the conditions for its conservation and sale on the market.

▪ The product

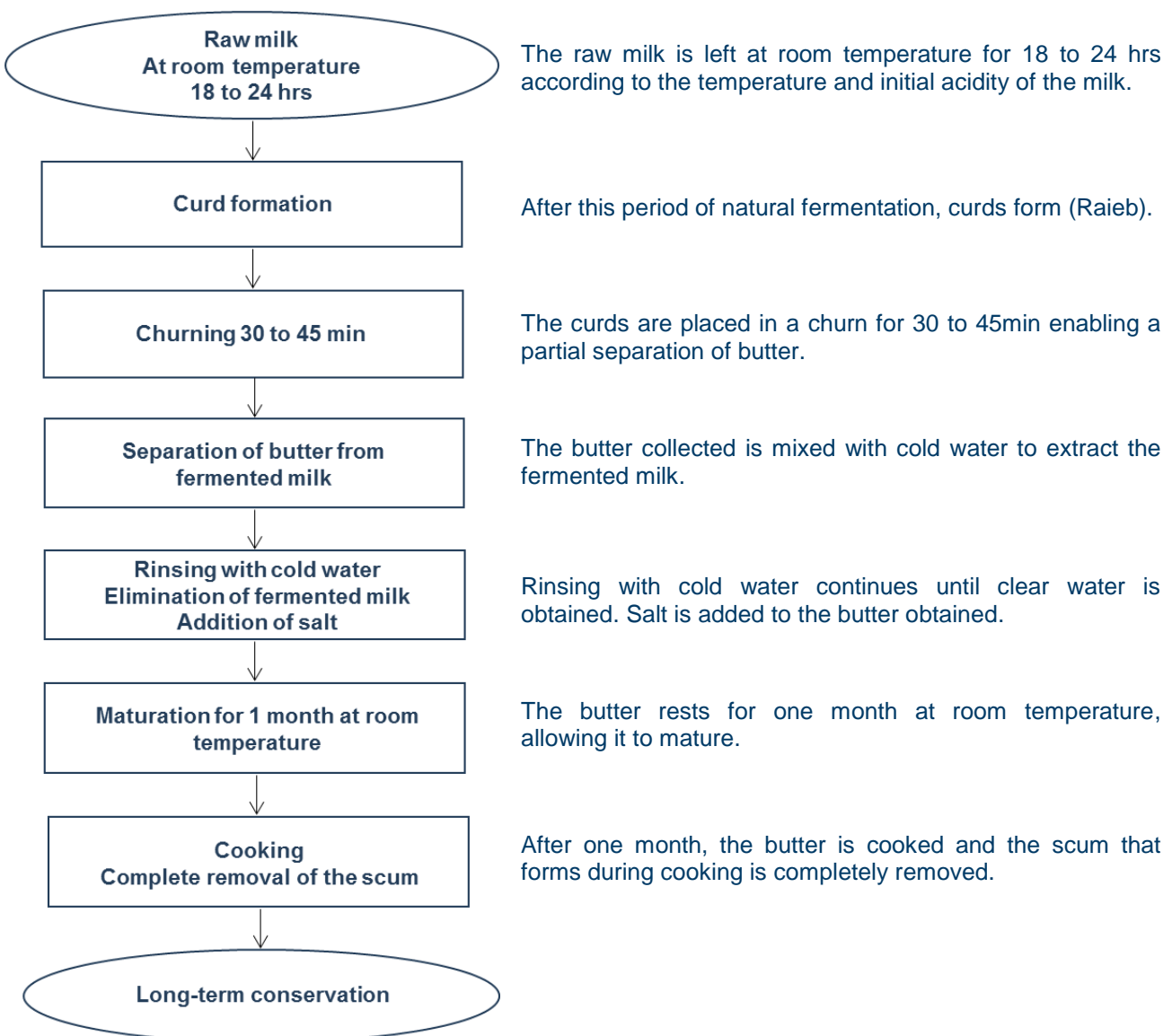

Appearance: in mounds and beakers

Description: clarified butter

Designation: Smen

The production of traditional butter (Zebda Arbi) also makes it possible to produce a kind of clarified butter called Smen.

This typical product is used in the preparation of traditional dishes such as couscous and several traditional Tunisian cakes.

▪ Production method


i Smen is a form of cooked fermented clarified butter. It can be kept at room temperature for a long period of about 12 months.

SPECIFICATION 4 – TESTOURI

i The present document defines the requirements to be met when processing cow's milk into "Testouri" as well as the conditions for its conservation and sale on the market.

▪ The product

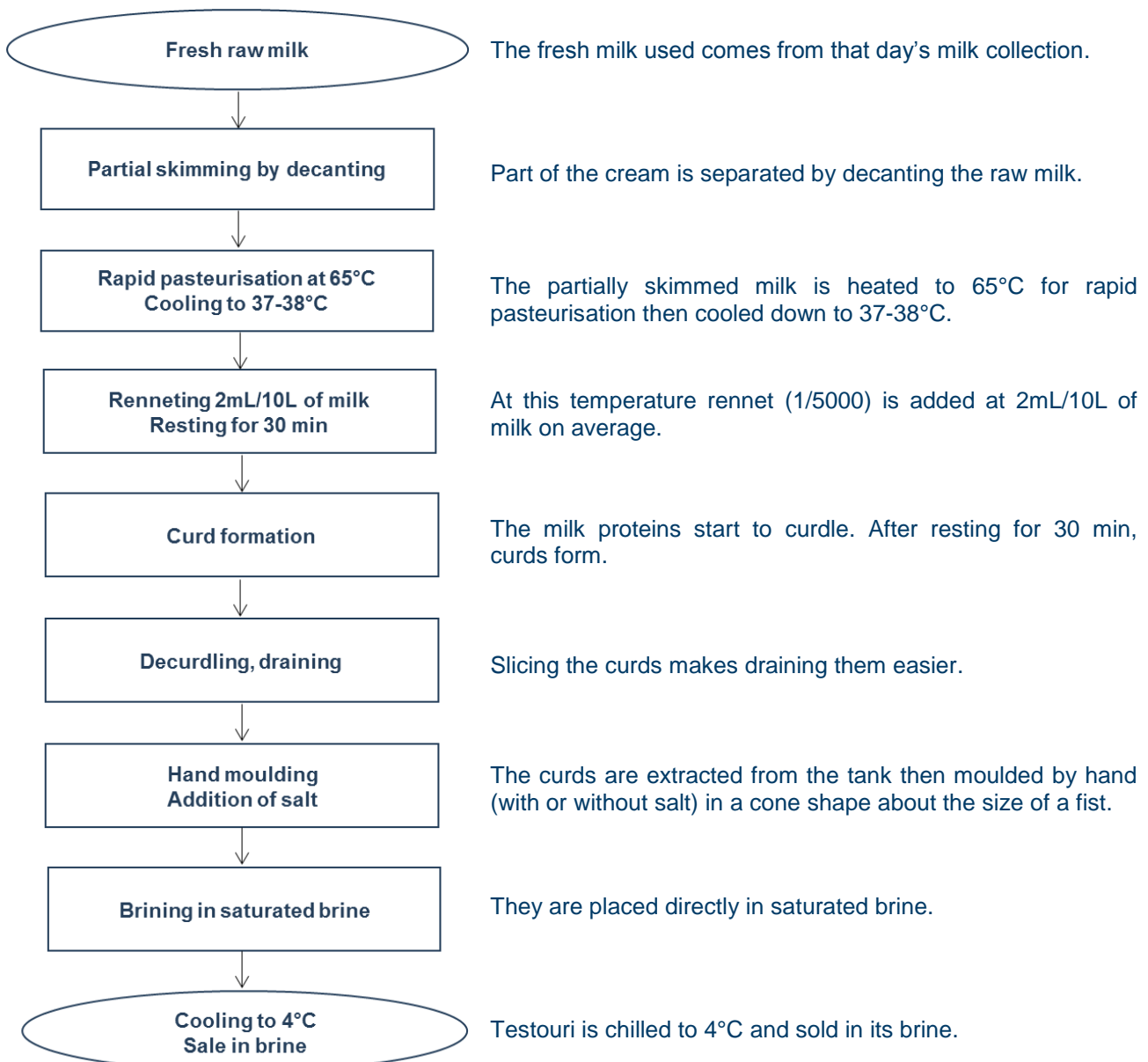

Appearance: cone-shaped mound

Description: fresh hand-moulded cheese

Designation: Testouri

Testouri is a typical fresh cheese from the north of Tunisia. Its reputation has won over virtually all the country. Its designation comes from the picturesque village of Testour where it originated.

In the beginning, this cheese was produced using sheep's milk from dairy sheep reared in the region of Testour. Due to growing demand coupled with the lack of raw material linked to the reduction in the dairy sheep herd, this cheese has been made from cow's milk for the last few decades.

▪ Production method


i Testouri is displayed in the form of 25 to 150g cones. Pepper or parsley can be added during production. The UBD of Testouri kept at 4°C is 5 days.

SPECIFICATION 5 – COW'S MILK RIGOUTA

i The present document defines the requirements to be met when processing cow's milk into "Rigouta" as well as the conditions for its conservation and sale on the market.

▪ The product


Appearance: cylinder shapes in 0.6 to 1.5 kg perforated pots

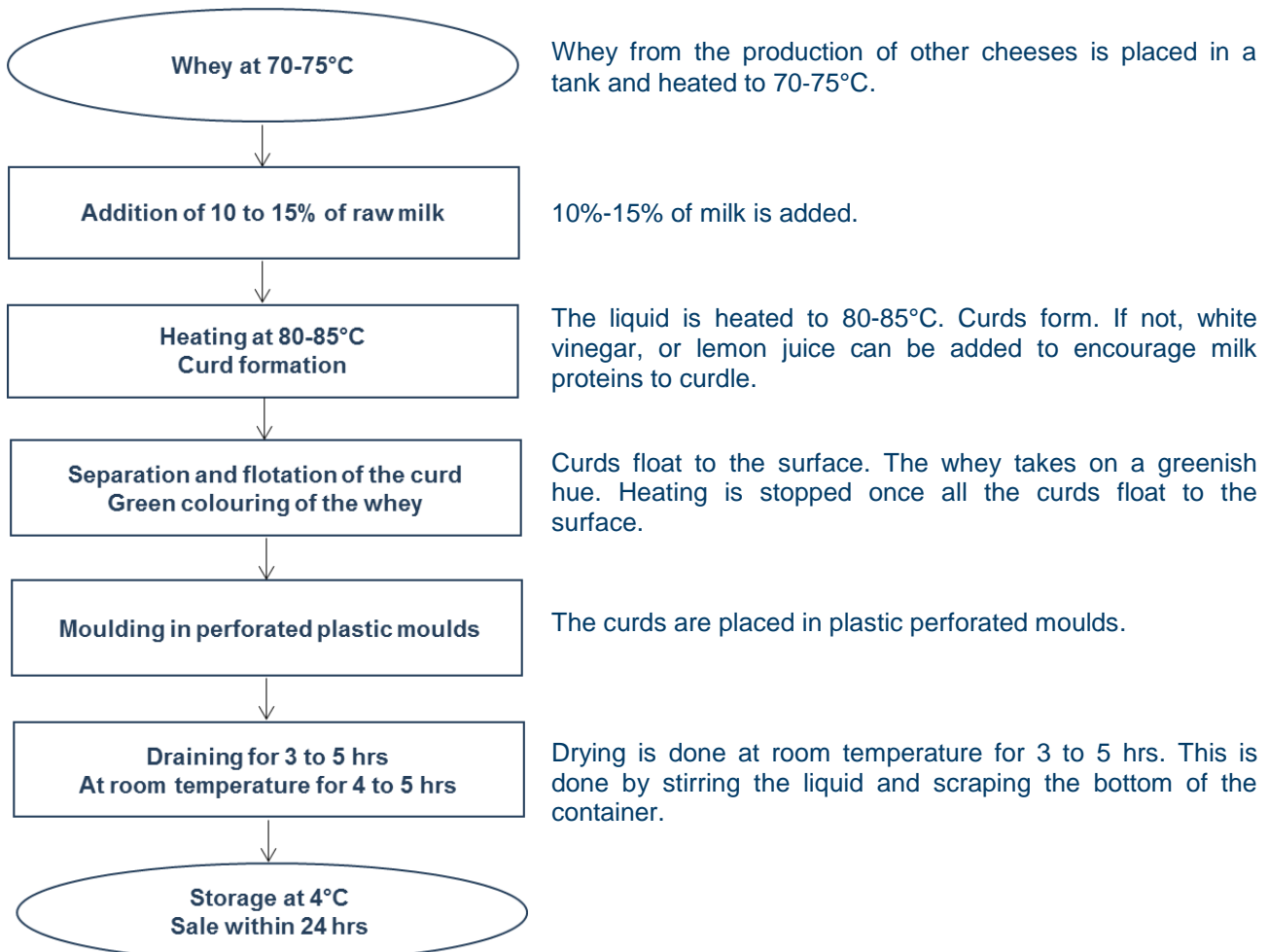
Description: fresh cheese

Designation: cow's milk Rigouta

Milk: 100% cow's milk

To make the most of producing various cheeses, producers use whey collected during processing to make a cheese called Rigouta by adding fresh milk.

This typical cheese can also be produced using sheep's milk and is much appreciated by the consumer. The production procedures for cow's milk Rigouta have not changed.

▪ Production method


i Cow's milk Rigouta is displayed in 0.6 to 1.5kg cylindrical forms. The UBD for Rigouta kept at 4°C is 5 days.

Typical sheep's milk products of Beja

OPERATORS IN THE CHAIN

The operators concerned by the present specifications are mostly Sicilo-Sarda dairy sheep farmers in an Agricultural Development Grouping (GDA) from the area defined in the section below as well as eventual transporters and milk processing units. Each unit must identify its livestock farmers and transporters.

The livestock farmers must follow a health programme including the vaccination of lambs and sheeps. They will regularly clean their sheepfolds and disinfect them.

Aside from the general rules of hygiene in handling milk as well as the statutory texts above, processing units are required to observe the following conditions:

- milk from the morning milking is processed immediately while milk from the evening milking is chilled to be processed the next day;
- delivery to the factory must be done with refrigerated vehicles;
- milk received must be kept at a temperature of 4°C;
- milk cannot be stored in these conditions for more than 24 hours.

These units will ensure, on their own account, that transport conditions comply with rules of hygiene. Where required, the mandated transporters must comply with current transport regulations for dairy products.

PRODUCTION AREAS AND PASTURELAND

The present specifications concern milk from Sicilo-Sarda dairy sheeps produced by farmers in a GDA in the Governorate of Beja. This concerns, to a greater or lesser degree, large farms in areas of Beja North: Oued Bagrat, Nagachet, Djhayliya, Bou Saada, El Faouar, El Hnaya, Ain Belouin, El Jguagua, etc. (Ben Youssef, Z., 2013).

This GDA encourages the rearing of Sicilo-Sarda sheeps on grazing land, participates in training and information for the producers, encourages the respect of hygiene and quality standards and participates in the collection of milk which is entirely processed in the region.

LIVESTOCK MANAGEMENT METHODS



According to the size of the flock, the production system is either semi-intensive (200 to 300 heads), or extensive (10 to 20 heads). Feed is based on grazing on natural meadows or on stubble, with frequent use of supplements (hay, straw and concentrates).

The tugging season traditionally takes place between April and June, which corresponds to a production period extending from November to June. Currently, in the Beja GDA, the time lag in the tugging season in one part of the flock helps extend the production period and therefore processing.

The Sicilo-Sarda sheep is characterised by a total milk production of 68 to 86 kg for an average production period of 225 days. The daily average is 0.53 kg (Moujahed et al., 2008). Milking is done manually.

MILK CHARACTERISTICS AT THE MILKING STAGE

Milk from the Sicilo Sarda sheep has the following composition:

Fat	7.04%	%
Proteins	5.45	%
Dry matter	16.92	%
Ashes	0.94	g/l
pH	6.79	-
Acidity	23.24	°D

Source: *Ben Sid El Haj et al., 2009.*

The entire milk production is destined for processing. Two market niches currently exist in the region of Beja and Mateur. Firstly, there are artisanal processing units producing fresh cheeses (Sicilian, Rigouta, etc.), much appreciated by local consumers, and secondly, there are industrial units producing cheeses well-known on the national market. (Carré de Mateur, Numidia, etc.).

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- OEP (2009) Office of Livestock and Pasture.

SPECIFICATION 6 –SICILIAN CHEESE OF BEJA

i The present document defines the requirements to be met when processing Sicilo-Sarda sheep’s milk into fresh cheese called “Sicilian cheese of Beja” as well as the conditions for its conservation and sale on the market.

▪ The product



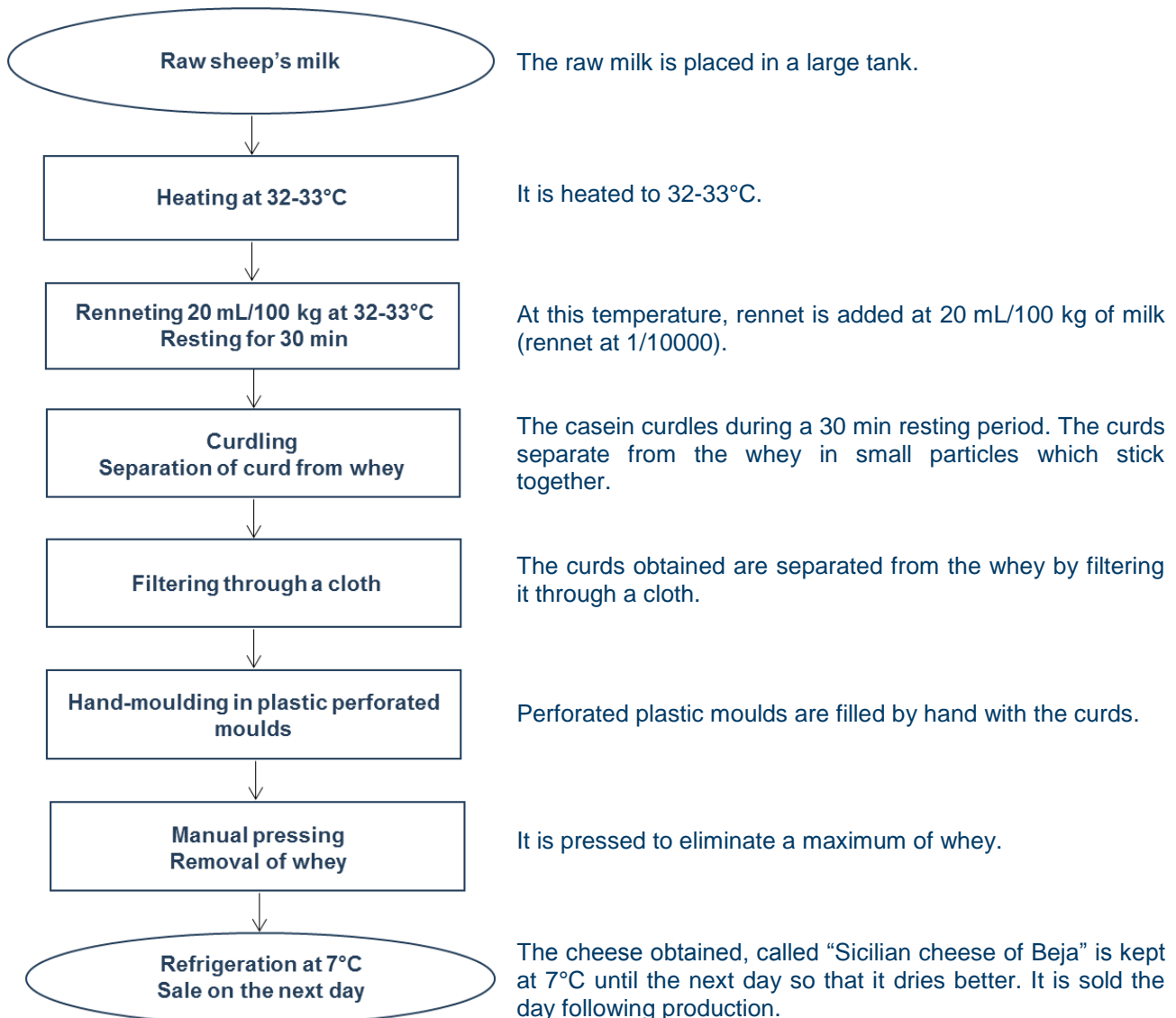
Appearance: Sicilian cheese of Beja comes in the form of 200 to 300 g portions

Description: fresh cheese

Designation: Sicilian cheese of Beja

Milk: 100% Sicilo-Sarda sheep’s milk, unpasteurised

▪ Production method



i The UBD of Sicilian cheese of Beja is 5 days. Unsold quantities can be placed in brine, completely dried then salted and grated to be sold as “grated cheese”.

SPECIFICATION 7 – RIGOUTA OF BEJA

i The present document defines the requirements to be met for processing Sicilo-Sarda sheep’s milk into fresh cheese called “Rigouta of Beja” as well as the conditions for its conservation and sale on the market.

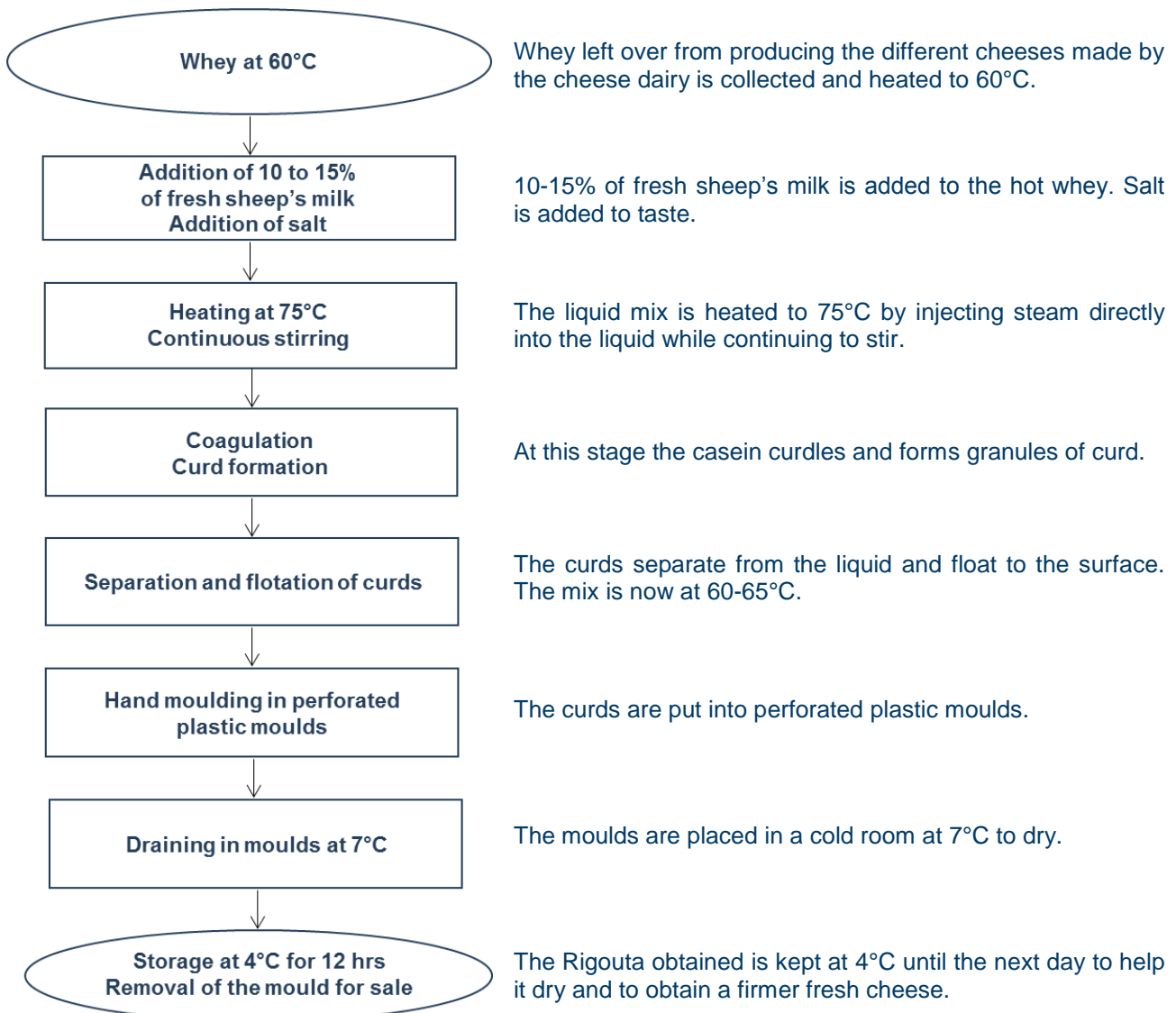
▪ The product


Appearance: cylindrical forms in 0.6 to 1.5 kg perforated pots

Description: fresh cheese

Designation: Rigouta of Beja

Milk: 100% Sicilo-Sarda sheep’s milk

▪ Production method


i Rigouta of Beja is delivered in 0.6 to 1.5kg perforated pots and sold to the consumer in pots or in slices. The UBD is 2 days.

SPECIFICATION 8 –TAYEB COOKED CHEESE

i The present document defines the requirements to be met when processing Sicilo-Sarda sheep's milk into a cooked cheese called "Tayeb" as well as the conditions for its conservation and sale on the market.

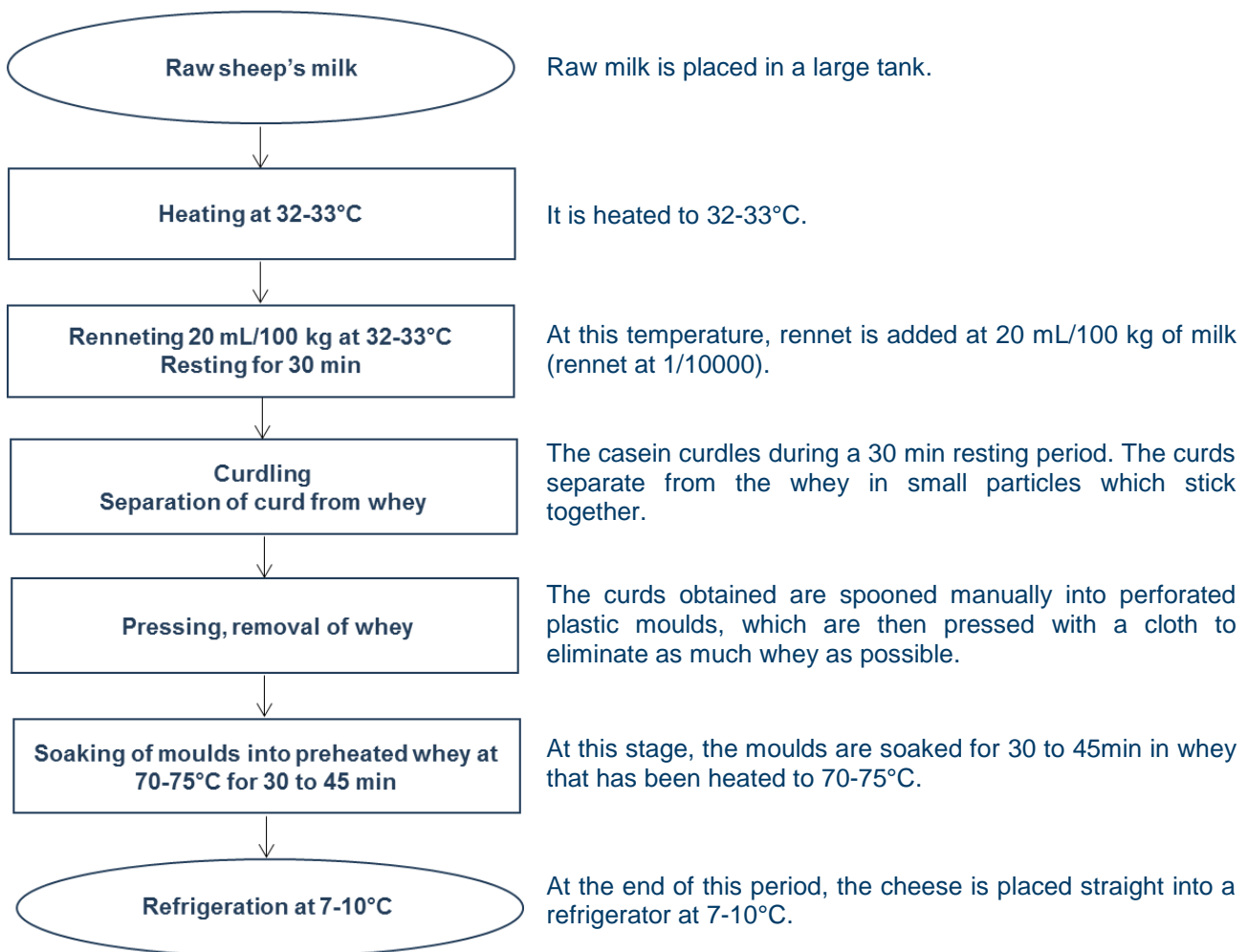
▪ The product


Appearance: approx. 600 g wheels sold whole or in slices

Description: cooked cheese

Designation: Tayeb cheese

Milk: 100% Sicilo-Sarda sheep's milk

▪ Production method


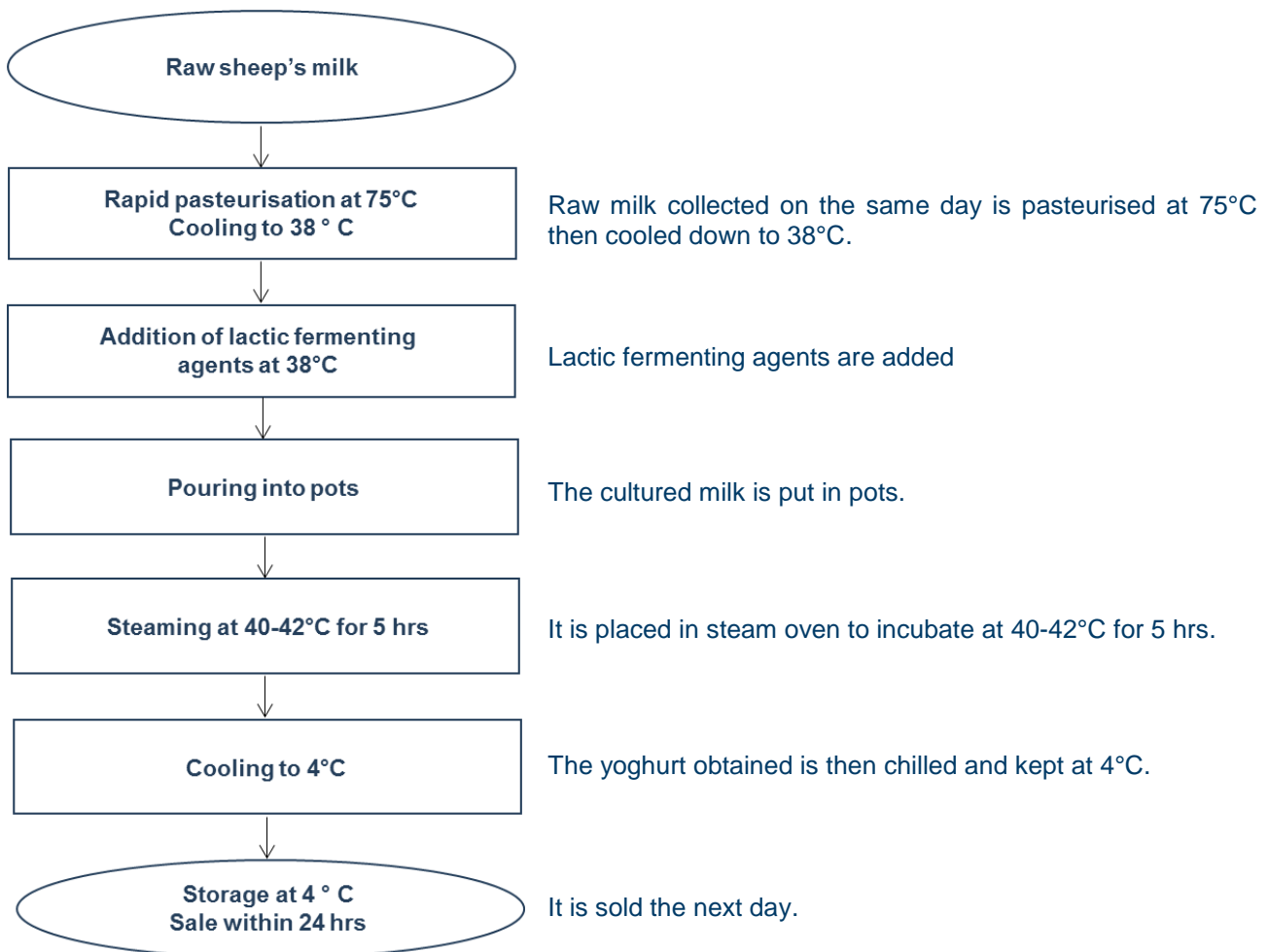
i The cooked cheese called "Tayeb" is kept at 4°C and has a UBD of 7 days.

SPECIFICATION 9 – SHEEP’S MILK YOGHURT

i The present document defines the requirements to be met when processing Sicilo-Sarda sheep’s milk into a “yoghurt” as well as the conditions for its conservation and sale on the market.

▪ The product


Appearance: pots of about 220mL
 Description: fermented milk
 Designation: Sheep’s milk yoghurt
 Milk: 100% Sicilo-Sarda sheep’s milk

▪ Production method


i Sheep’s milk yoghurt can be kept at 4°C and the UBD is 5 days.

SPECIFICATION 10 – LES TROIS FERMES MATURED CHEESE

i The present document defines the requirements to be met when processing Sicilo-Sarda sheep's milk into "Les Trois Fermes matured" cheese as well as the conditions for its conservation and sale on the market.

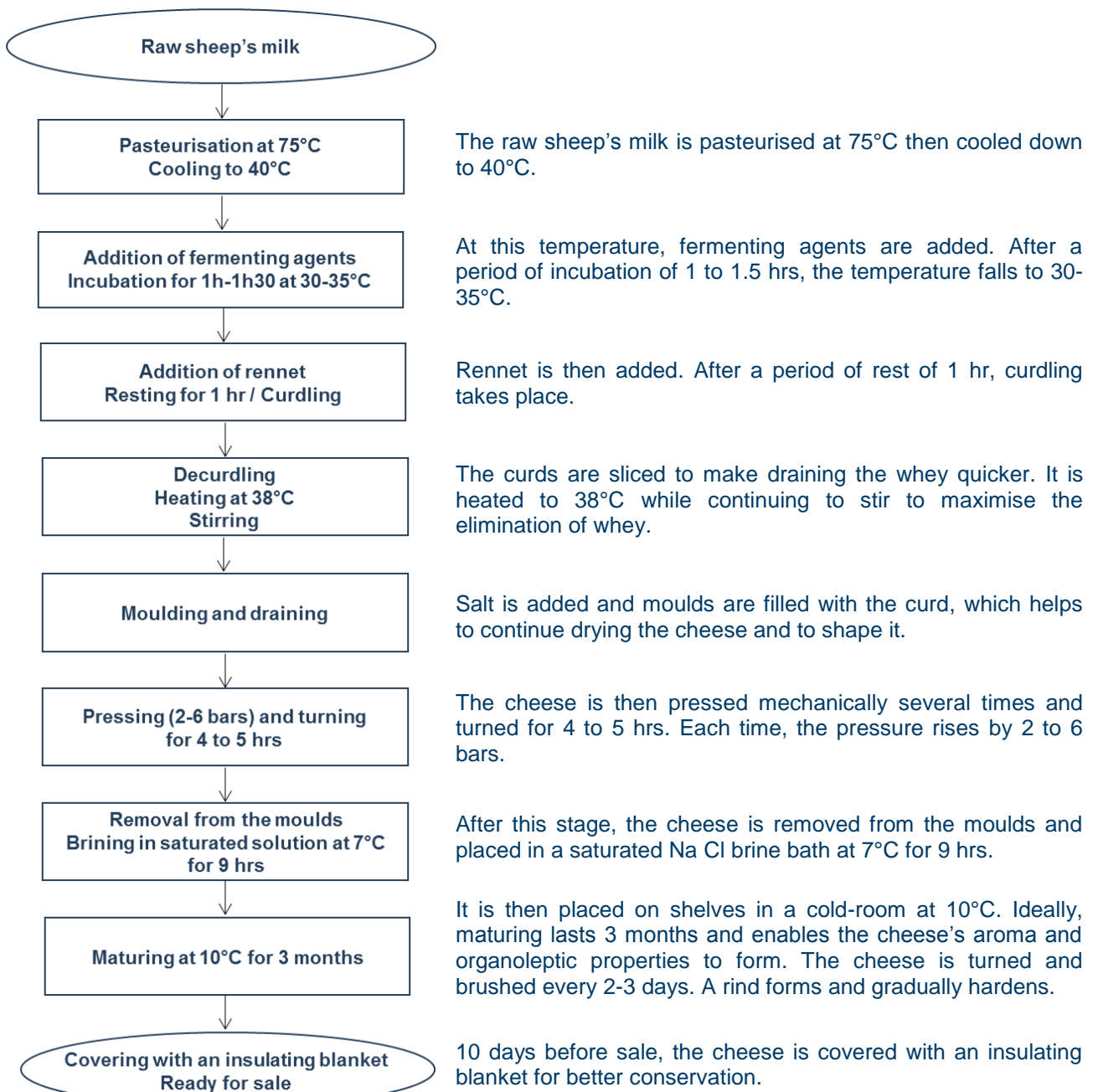
▪ The product


Appearance: approx. 2 kg wheels for sale in slices

Description: matured cheese

Designation: Matured Beja "Les Trois Fermes" cheese

Milk: 100% Sicilo-Sarda sheep's milk

▪ Production method


i The conservation temperature is 10°C.

Developing the typical dairy products of Bizerte and Beja

Diagnosis and local strategy

November 2013

LACTIMED aims to foster the production and distribution of typical and innovative dairy products in the Mediterranean by organising local value chains, supporting producers in their development projects and creating new markets for their products. The project is implemented under the ENPI CBC MED Programme, and is financed, for an amount of EUR 4.35 million, by the European Union through the European Neighbourhood and Partnership Instrument. From November 2012 to May 2015, ANIMA and its 11 partners will organise a hundred operations targeting the various stakeholders of the dairy value chains of Alexandria and Beheira (Egypt), the Bekaa and Baalbeck-Hermel (Lebanon), Bizerte and Beja (Tunisia), Sicily (Italy) and Thessaly (Greece).

So as to encourage integrated development of the dairy chain in Bizerte and Beja, the project will base on a diagnosis of this value chain and study opportunities in the national and international markets, thus helping local authorities and support structures to adopt a strategy for promoting local typical dairy products.

The diagnosis conducted from January to September 2013 involved the following steps:

- Inventory of the dairy chain: literature review, identification of local stakeholders, interviews and working groups with experts and key stakeholders;
- Field survey with 29 livestock farmers, 8 processors, 18 distributors and 10 institutional bodies;
- Identification of local typical dairy products and drafting of production specifications for 5 cow's milk products from Bizerte and 5 sheep's milk products from Beja;
- Summary, definition of strategic priorities to ensure the development of the dairy chain and proposals for the creation of a dairy cluster.

The results of the diagnosis were presented on 9 October 2013 at a regional restitution workshop in Bizerte and discussed with all the project partners and associates as well as with a panel of Tunisian and international experts. The conclusions of these discussions have been incorporated into the present report.

More information at: www.lactimed.eu